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AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Including · GAS INDUSTRY · Est. 1900 ·

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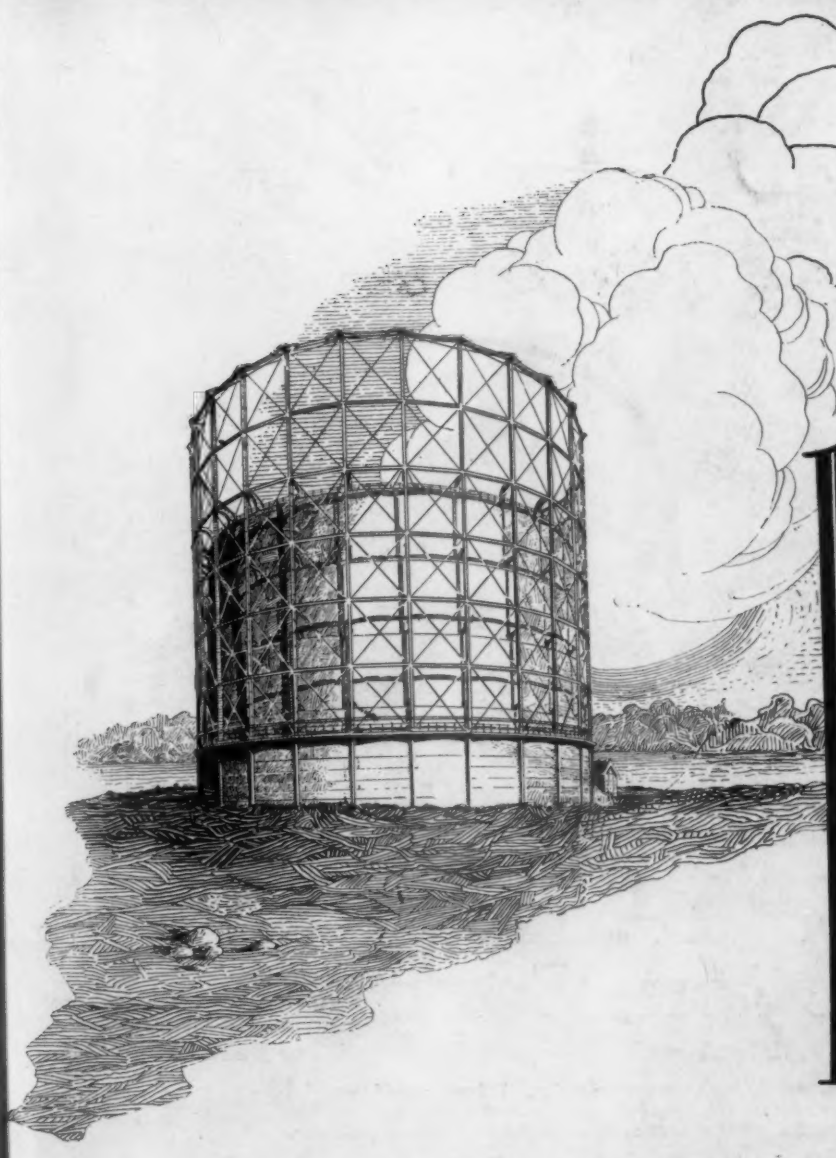


"ABILITY TO SERVE"

STACEY BROS.
GAS CONSTRUCTION
COMPANY

Cincinnati, Ohio
New York - Boston

GAS PLANT ENGINEERS

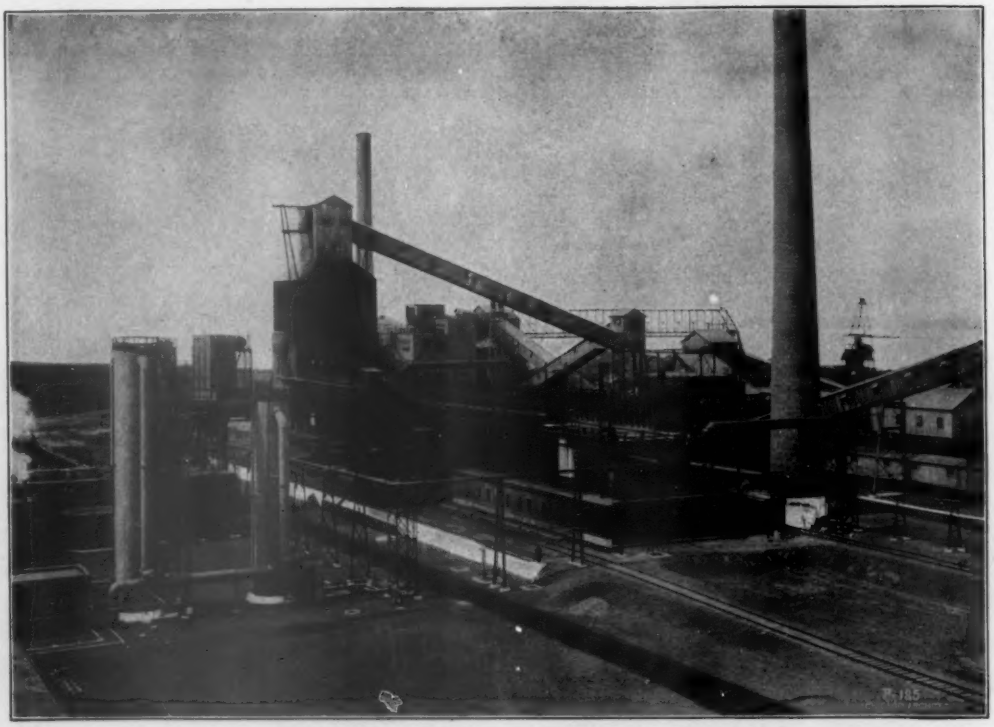
BUILDERS OF
LOW AND HIGH PRESSURE
GAS HOLDERS

The Stacey Brothers are the Pioneer Gas Holder Builders of America.

"THE STACEY BULLET"

THE WORLD IS OUR FIELD

BECKER TYPE OVENS of the Connecticut Coke Company



The By-Product Coke and Gas Plant of the Connecticut Coke Company at New Haven includes 61 Becker Type Combination Ovens with an Annual Coal Capacity of 550,000 tons. Auxiliaries include a material handling plant, Koppers Gas Producers, Liquid Purification and by-product recovery plants. ¶Designed and built by the Koppers Construction Company, this plant is a complete operating unit for the production of Gas and Coke.

KOPPERS Construction Company

Chicago **Pittsburgh** **New York**

Offers a complete engineering service to gas companies. It is prepared to make competent studies of gas works, recommend, design and build appropriate new or auxiliary equipment and suggest the most efficient operating practice.

Koppers equipment includes . . . Becker Type Oven Plants ∿ Continuous Verticals ∿ Gas Producers ∿ Water Gas Plants ∿ Liquid Purification Plants ∿ By-Product Equipment Gas Dehydration Plants ∿ Material Handling Plants ∿ Phenol Removal Plants, Etc.

FOR ECONOMICAL GAS PRODUCTION

AMERICAN
GAS JOURNAL
Established 1859 *Pioneer of the Gas Industry*
Including GAS INDUSTRY Est. 1900.

Executive and Editorial Offices, 53 Park Place, New York City

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H. M. RILEY, *Editor*

R. S. McBRIDE, *Consulting Editor*, Washington, D. C.

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THE STACEY MANUFACTURING COMPANY

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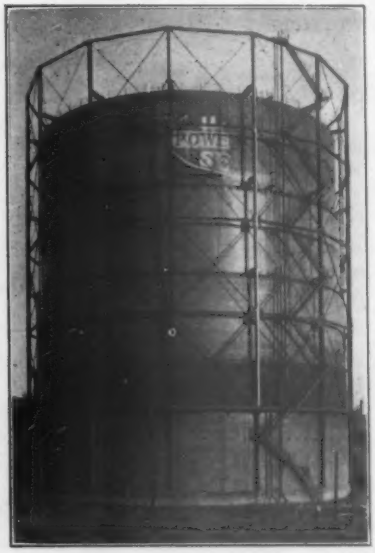
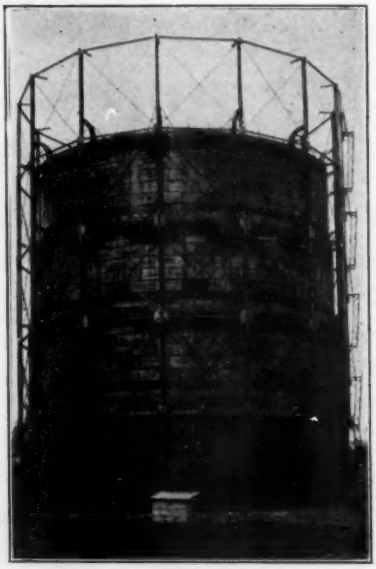


GAS HOLDERS

GAS PLANT EQUIPMENT PURIFIERS STEEL TANKS

CAST IRON VALVES AND FITTINGS

WELDED STEEL PIPE AND FITTINGS



Builders of More Than 1300 Gas Holders

STACEY SINCE 1851

Pioneer Builders of Low and High Pressure Gas Holders

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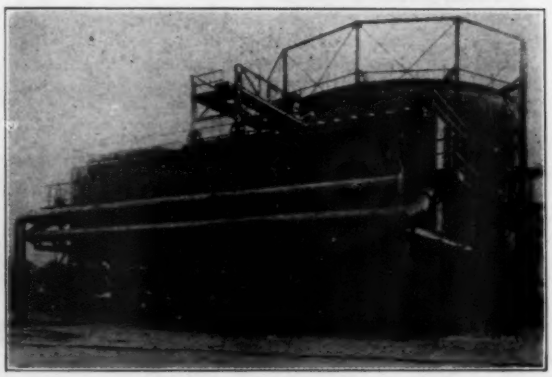

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New York Office: 52 Vanderbilt Ave. Telephone Vanderbilt 1549

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The ***Backrun*** gives to Carbureted Water Gas Equipment a distinct advantage in heat economy.

The ***Backrun*** reduces fuel consumption per MCF and increases the capacity of the machine.

The ***Backrun*** removes obstacles to the effective use of bituminous coal for generator fuel.

The ***Backrun*** affords a method of producing lower specific gravity Carbureted Water Gas.

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The ***Backrun*** wherever installed, will pay for itself in decreased holder cost of Carbureted Water Gas.

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Division Allied Chemical and Dye Corp.
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275,000 cu. feet of STEAM is released to the air for each 10 tons of COKE wet quenched

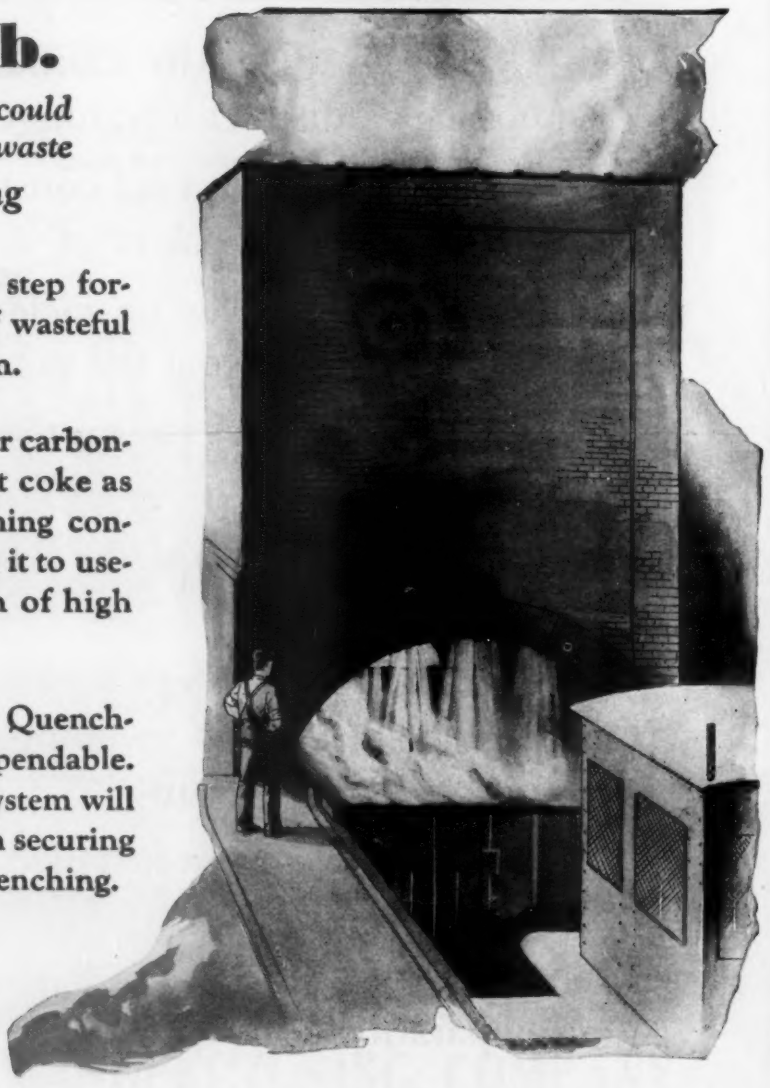
10,000 lb.

of high pressure steam could be produced from this waste by Dry Quenching

Dry Quenching is another step forward in the elimination of wasteful methods in coke production.

40% of the heat required for carbonization remains in the hot coke as sensible heat. Dry Quenching conserves this heat by applying it to useful work—the production of high pressure steam.

The Sulzer System for Dry Quenching coke is simple and dependable. Literature describing this system will be sent to those interested in securing the advantages of Dry Quenching.



Dry Quenching Equipment Corporation

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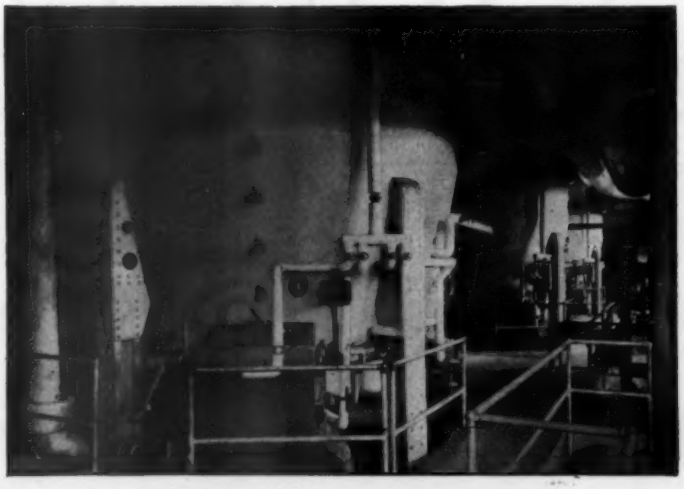
200 MADISON AVE. NEW YORK — N.Y.

A SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

U. G. I. MECHANICAL GENERATOR



Three U. G. I. Mechanical Generators at Philadelphia Gas Works Company

Results from the operation of three U. G. I. Mechanical Generators at Philadelphia

Daily Capacity	*Generator Fuel per M.*	*B. t. u. of Gas*
15,000,000 cu. ft.	*25 lbs.*	*530*

THE U. G. I. Mechanical Generator offers the following important advantages:

Continuous operation for extended periods
Low fuel consumption
Low carbon loss in ash
Low maintenance
Heat otherwise lost recovered as steam
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The U. G. I. Mechanical Generator is self-clinkering, and with the U. G. I. Automatic Charger, provides a completely automatic controlled and operated water gas set from fuel bin to ash car.

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Smoot Steam Accumulator at Atlantic City Gas Co., Atlantic City, N. J.
The U. G. I. Contracting Co., Engineers.

The Smoot Steam Accumulator quickly pays for itself in savings of high pressure steam and boiler fuel by

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3. Acting as a water and oil separator so that the steam is clean and dry when delivered to the gas generators or the feed water heaters.

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"Mac" is one of our organization, a regular "trouble shooter." What "Mac" doesn't know about operating a gas plant is hardly worth knowing.

Managers, superintendents and engineers of gas plants all over the country have the utmost confidence in "Mac" and his ability to straighten out tangles.

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His observation may only mean a few readjustments, a few patches here and there or the overhauling of some apparatus. Again, if the trouble is deep seated, it may lead to some replacements or additions, or the designing of an entirely new plant.

Whatever his findings, our entire organization is there to help you with their accumulated knowledge and over a quarter century experience to put your plant on a sound operating basis.

Let us know if you need "Mac"—we know that his visit will be welcomed and his services valued.

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Engineers—Builders

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Positive *and* Economical Treatment of Tar Emulsions

APPARATUS

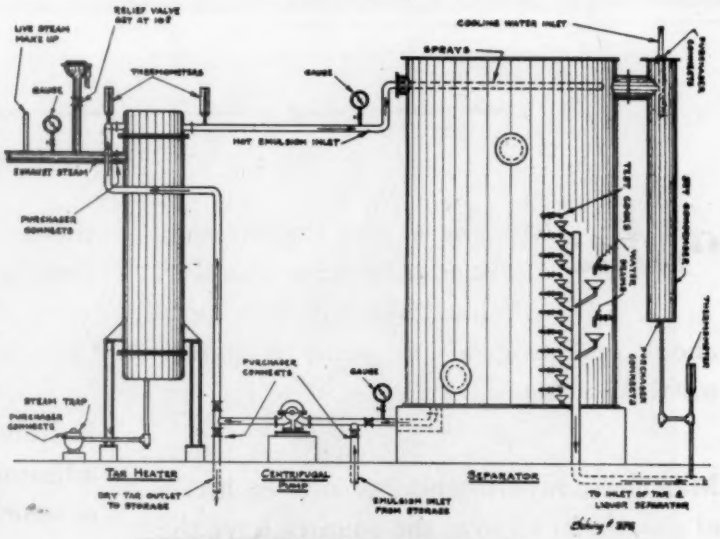
1—Separating Tank which contains Emulsions to be treated.

2—A circulating pump.

3—A heat exchanger using exhaust steam.

4—Separating sprays in top of separating tank.

5—A small Jet Condenser for condensing small amounts of light oil and water vapor.



KLEINMAN TAR DEHYDRATOR – ILLUSTRATIVE.
PATENT APPLIED FOR

PROCESS

1—Pumping to a pressure which gives 5 pounds per square inch at the spray nozzles.

2—Heating Emulsion to about 220° F.

3—Emulsion leaves sprays reducing the pressure causing some of the water to flash into steam which breaks up the emulsion *without foaming.*

4—Mechanical separation in the separating tank.

5—Drawing off separated water.

6—Drawing off tar to dry tar Storage.

RESULT

A dry tar containing about 1% moisture.

Low Operating Costs

Send for full details of design and operation of this Positive and Economical Process.

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[CONNERSVILLE]

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CONNERSVILLE
Blowers-Gas Pumps-Meters-Cycloidal Pumps

are important factors in production and distribution equipment.

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"LUX" on Dry Basis contains from 52 - 59% Ferric Hydroxide and only 3 to 3½% Lime as CaO.

Our ready mixed *"LUX-SPONGE"* made from selected large and tough shavings is finding more and more friends.

"LUXIT H. T." Cement (Dry)

For Patching Hot Retorts, Refractory Linings, etc. Shipped in 110 lb. bags.

Order Sample Shipment Today!

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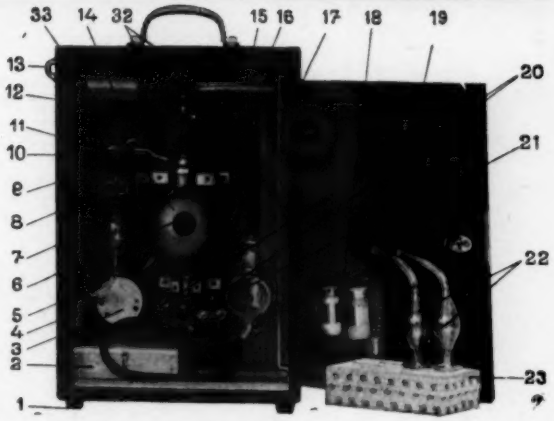
192 FRONT STREET

HAND CALORIMETER

Dr. Strache-Kling (Loeffler Model)

For Determining the Heating Value of Gases



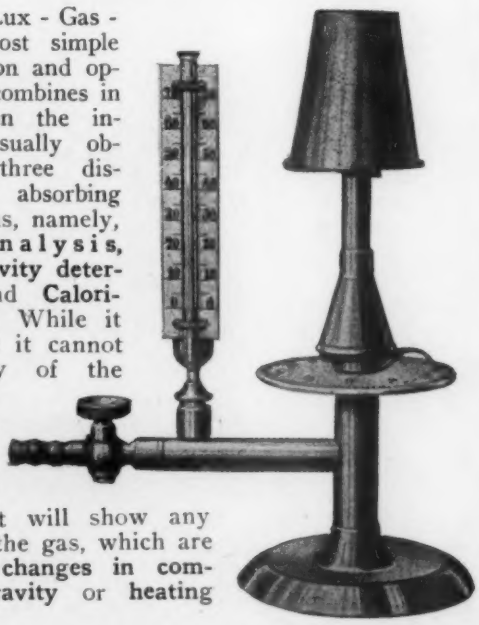
1. It is portable (weight under 10 lbs.)
2. It is accurate.
3. It requires only small quantities of gas for each determination.
4. It requires no water connection.
5. A determination can be made in one minute.
6. It can be operated by anybody without special training.
7. It does not require standardizing by H_2+O gas.
8. Its cost is reasonable.

The principle involved is the burning of an air gas mixture, of a known quantity of gas with a definite volume of air, in an explosion pipette insulated by means of a Dewar Vacuum jacket.

The temperature rise is recorded on an inserted thermometer. Each instrument is equipped with a computer table.

DR. OTT-LUX-GAS TESTER

For Indicating Change in Gravity of Gas, also in Heating Value of Gas



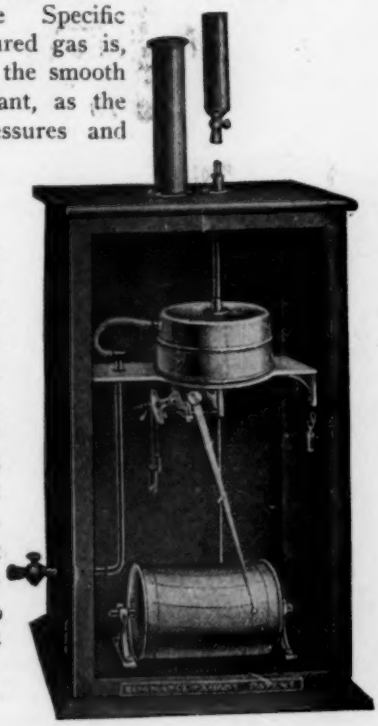
Dr. Ott - Lux - Gas - Tester is most simple in construction and operation. It combines in one operation the information usually obtained by three distinct time absorbing manipulations, namely, the **Gas Analysis, Specific Gravity determination** and **Calorimeter test.** While it is true that it cannot replace any of the three tests, where specific results are required it is equally true that it will show any changes in the gas, which are caused by **changes in composition, gravity** or **heating value.**

LUX-RECORDING GAUGE

For Specific Gravity of Gas

(Simmance and Abady System)

To determine the Specific Gravity of manufactured gas is, today, as essential to the smooth running of a gas plant, as the determination of pressures and heating values.



In the Simmance Abady System-Lux-Recording Specific Gravity balance, we have an instrument which will give us, at a glance, not only any changes that may have occurred at any time, but furnishes a permanent record of the Specific Gravity of the gas throughout the 24 hours of the day.

LUX COMPANY INC.

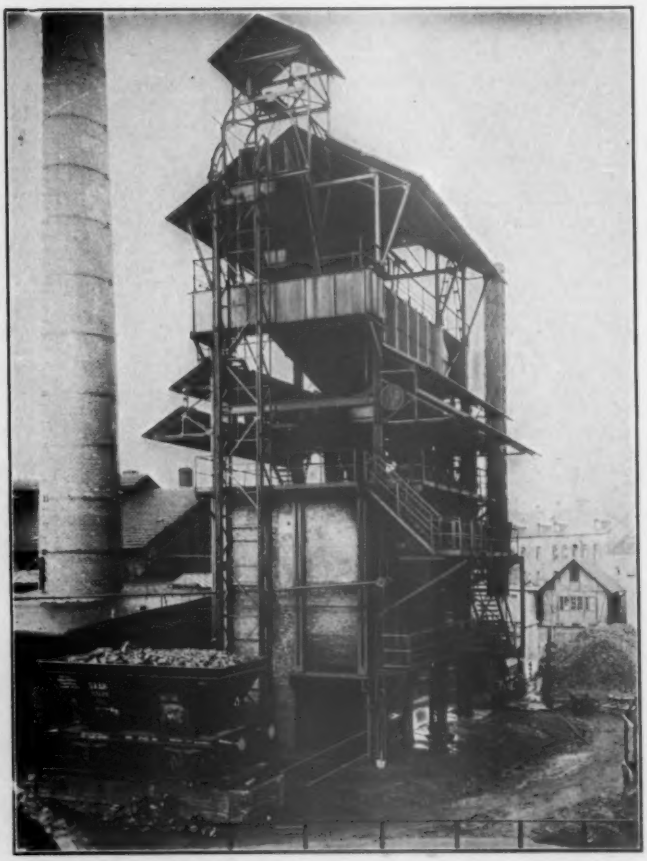
NEW YORK CITY, N. Y.

"INDUGAS"

VERTICAL CHAMBER OVEN

With Water-sealed Drop Door

INTERMITTENT TYPE



Minimum Labor
Low First Cost

The annual operating reports of the Association of Swiss Gas Plants disclose that the "INDUGAS" ovens produce the largest yields of gas per ton of coal.

The following table shows the actual average yields from coal containing less volatile matter than the average American coal:

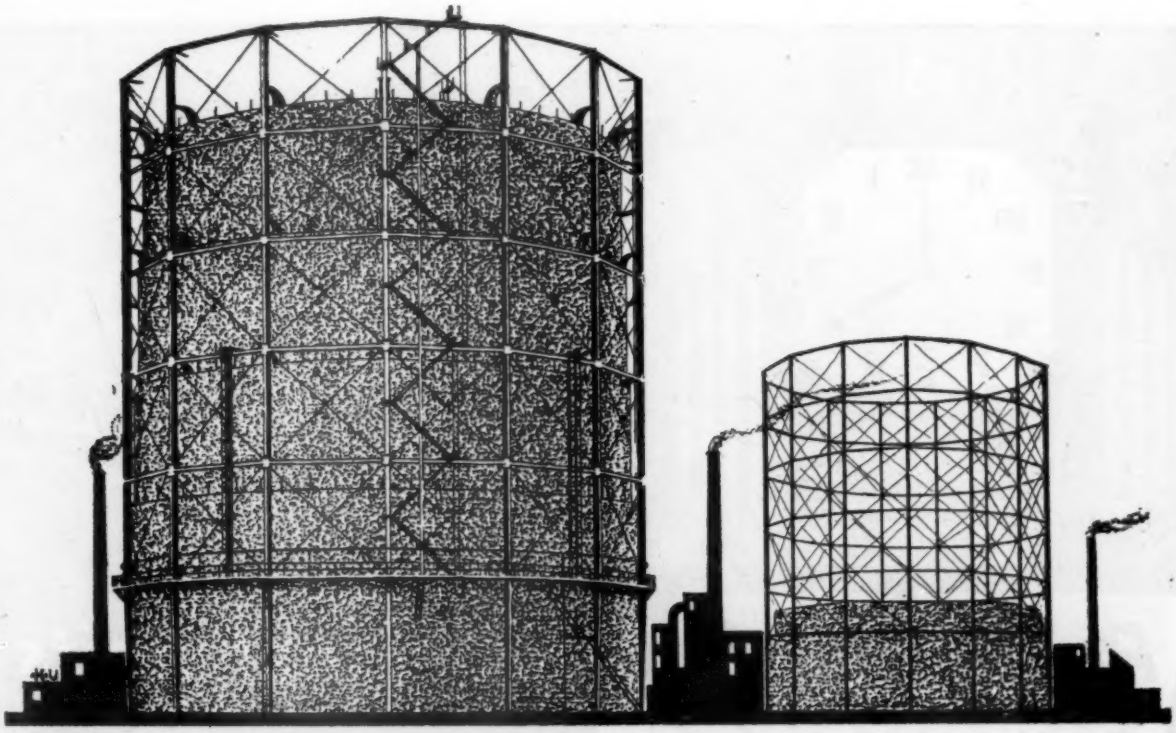
City	Time	Yield cu. ft. per net ton	Heating value B.t.u. (gross)
Baden, Switzerland	4 years average	14075	560
Olten, Switzerland	2 " "	13317	570
Friedrichshafen, Germany	4 " "	16045	515

There's a Reason

Full information, layouts and estimates gladly furnished

INDUGAS COMPANY, Inc.

114 LIBERTY STREET, NEW YORK



ECONOMY--

Economy through years of service is the one factor that seems to include all the desirable features sought in a Gas Holder.

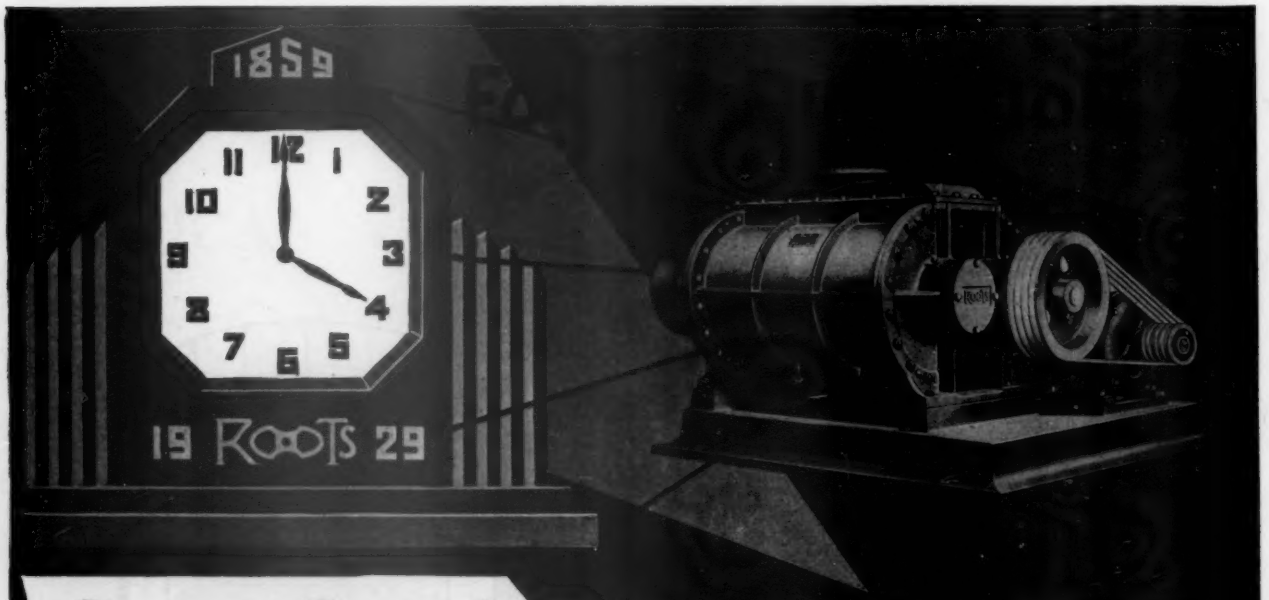
It presupposes the soundness of engineering, the quality of materials; the care of assembly; the daily efficiency and the fairness of initial cost.

Ultimate economy has always been the basis of plans and specifications prepared by the Cruse-Kemper Company. And the basis remains unchanged.

CRUSE-KEMPER CO.

AMBLER, PENNA.

Design that Fits the Purpose | **Highest Grade Materials** | **26 Years of Experience**



Roots Fourth Dimensional Units

Frankly, we're not going to commit ourselves, but if TIME is the fourth dimension, we've been building "Fourth Dimensional" Pumps, Blowers and Meters for years.

Roots units, with long time service records of 38 to 40 years, are still in efficient service today.

"Roots Users Root for Roots"

Now, our use of roller bearings permits greater speeds with less horsepower, closer clearances, increased efficiencies—all of which means even longer "Fourth Dimensional" service for Roots units.

SEE THE MODERN ROOTS BLOWERS IN OUR CATALOG

TIMKEN Tapered ROLLER BEARINGS

The P.H. & F.M. ROOTS CO.

CHICAGO Peoples Gas Building — CONNERSVILLE, INDIANA — NEW YORK 120 Liberty Street

Laying 12"
Steel Main
at Reading, Pa.

For GAS MAIN CONSTRUCTION

Three important factors in low construction costs obtained by this organization are as follows:

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On each job adequate modern labor-saving equipment is provided at rental rates which represent only the actual carrying charges.

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Each field organization is composed of experienced men who are specialists in pipe line construction.

In addition the services of our home office staff — made up of experts in all types of engineering and construction — are available when required.

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All our work is done on the basis of actual cost plus a fee as our compensation. Under this form of contract, 100% of all savings revert to the client.

This method operates in the interests of both our clients and ourselves.

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS

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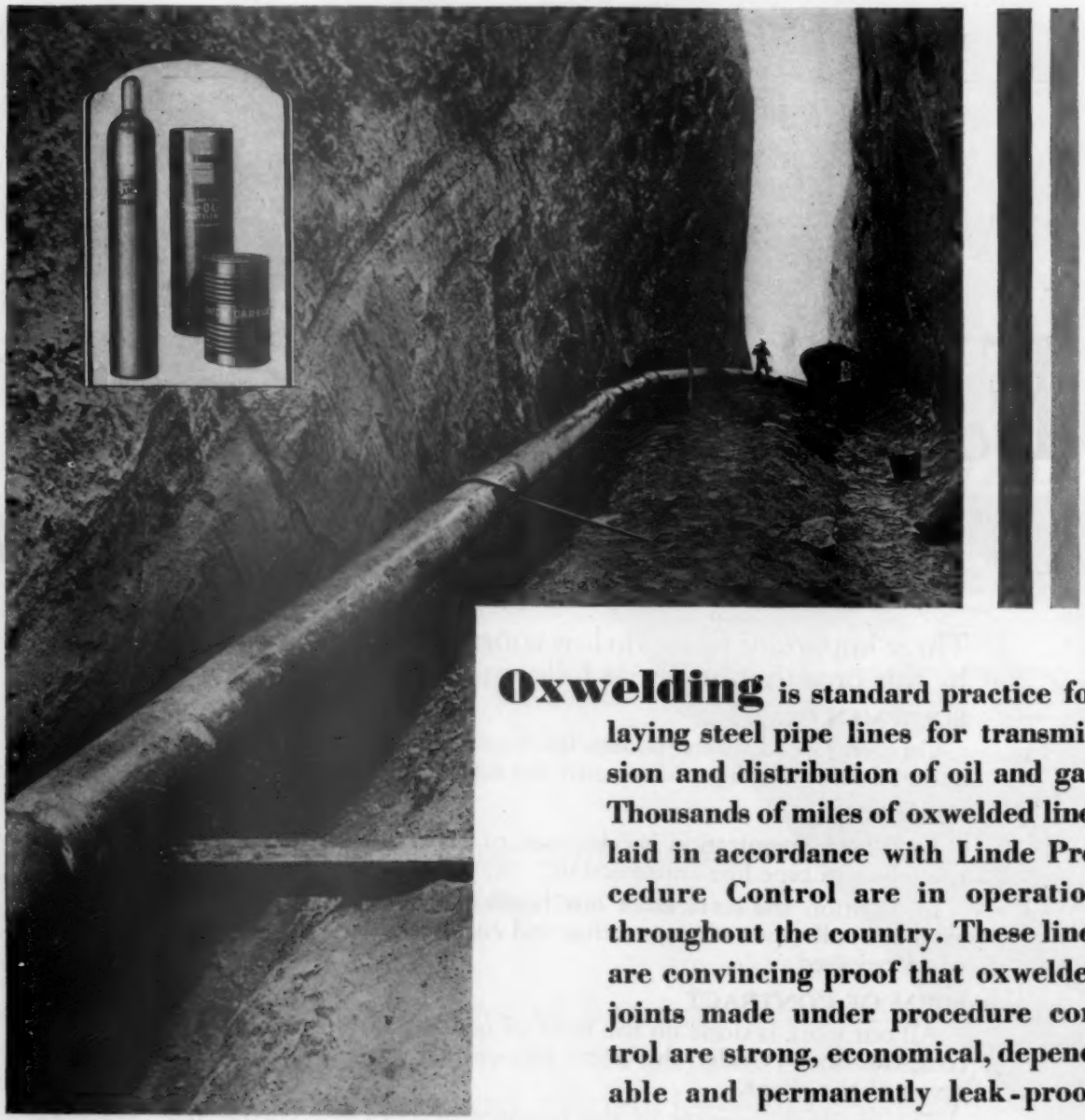
DWIGHT P. ROBINSON, PRESIDENT

Philadelphia
Broad and Arch Streets

Chicago
Conway Building

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

Oxwelded Pipe Lines for Oil and Gas



Oxwelding is standard practice for laying steel pipe lines for transmission and distribution of oil and gas. Thousands of miles of oxwelded lines laid in accordance with Linde Procedure Control are in operation throughout the country. These lines are convincing proof that oxwelded joints made under procedure control are strong, economical, dependable and permanently leak-proof.

Pioneers in Procedure Control for Welding

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The Linde Air Products Company

Prest-O-Lite
Dissolved Acetylene
The Prest-O-Lite Company, Inc.

Oxweld
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Oxweld Acetylene Company

UNION CARBIDE
Union Carbide Sales Company

Units of UNION CARBIDE UCC and CARBON CORPORATION

General Offices: 30 East 42nd Street, New York, N. Y. *Sales Offices:* In principal cities of the country

64 Linde Plants—45 Prest-O-Lite Plants—154 Oxygen Warehouse Stocks—138 Acetylene Warehouse Stocks —38 Apparatus Warehouse Stocks—235 Carbide Warehouse Stocks.

Now is the time to put Eveready Prestone, the perfect anti-freeze, in your automobile radiator — Eveready Prestone is guaranteed by National Carbon Company, Inc., unit of Union Carbide and Carbon Corporation.

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The Curtis Supply Co.
New York, Mohawk,
American Hard Wall Plaster Co.
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New York, Rochester,
American Clay & Cement Corp.
Wm. Summerhays Sons Corp.
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Pennsylvania, Pittsburgh,
Pittsburgh Supply Co.
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Read & Landy, Inc.
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Spartanburg Mill Supply Co.
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Greenville Textile Supply Company
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Reed & Duecker
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McCarthy-Jones & Allen Co., Inc.
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Norvell-Wilder Hardware Co.
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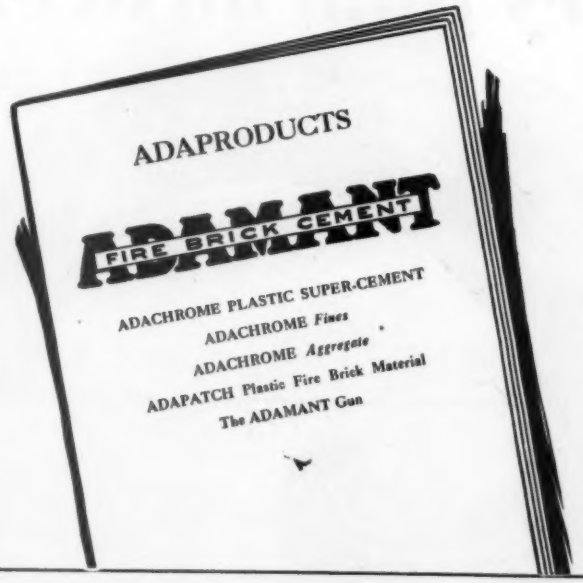

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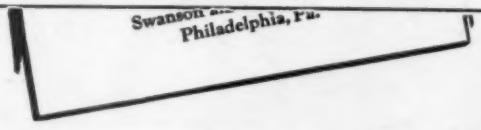

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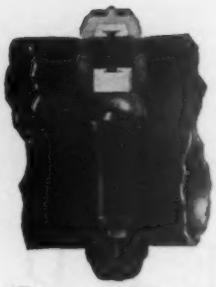

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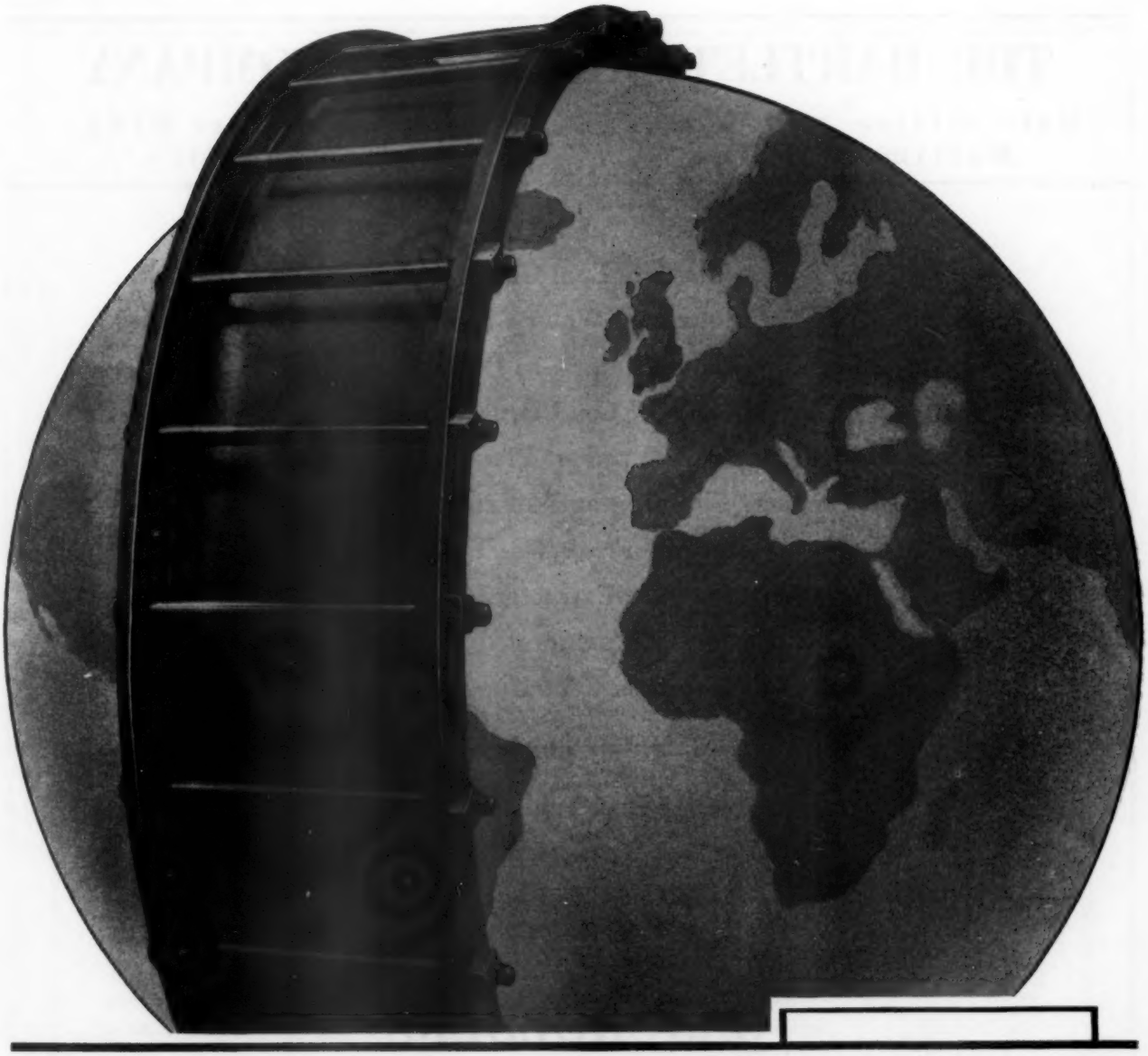

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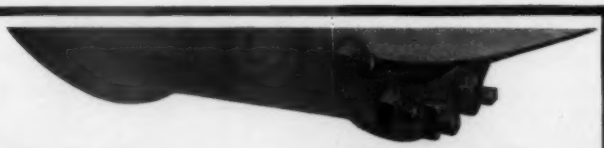

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HENRY M. RILEY, *Editor*

Conventions—Milestones of Industrial Progress

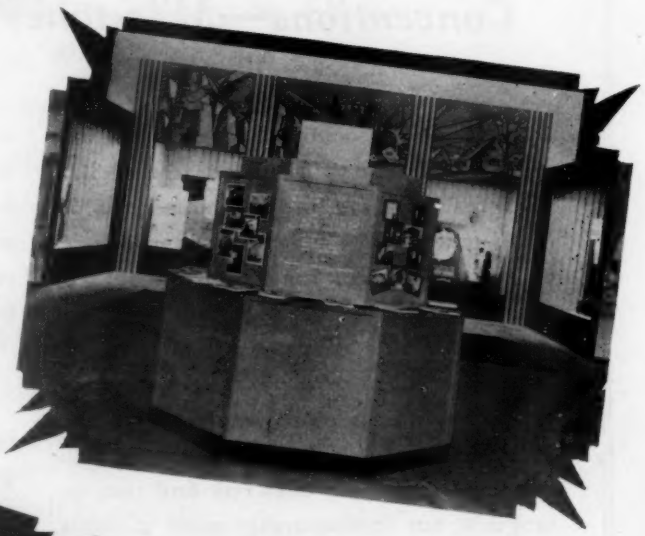
AGAIN an annual gathering of the gas industry has demonstrated that the greatest thing in the industry is its brain power. We may read from official censuses of coal carbonized, of gas sold, of appliances made and installed, even of customers gained and lost. But these are the inanimate, the mere tangible, crude, and more or less easily replaceable parts of the business. Nowhere save at the Annual Convention does one find that intangible, but immeasurably more valuable, part of the industry, its composite brain power.

American Gas Journal congratulates the industry on that interest and that progressiveness which will bring together nearly 6,000 individuals for such a meeting and exhibit as was had at Atlantic City during the past month. No industry is altogether hopeless which can bring as great a group as this together bent upon a common cause. And certainly there was nothing in the Atlantic City convention to indicate pessimism or backwardness in the public-utility gas business of America.

To those who attended the convention there is little need to reflect the importance of the personal conference and the exchange of ideas which took place. To those who did not attend we merely offer our condolences. They missed something, something big and vital for themselves and the industry.

Gas companies are today encountering fundamental and almost startling changes. The official proceedings at Atlantic City which are summarized in the succeeding pages of this issue can but in small measure reflect these trends. The personal contacts with the thinking men of the business which were possible at Atlantic City gave a much better picture of what is going on. Those who missed their opportunity to gain that knowledge and that inspiration which comes from a great convention will do well to begin at once to lay plans that they shall not experience a like loss another year. Conventions and exhibits with all their trials and with all their defects, for no one who is wise claims that any of them are perfect, are still the best clearing house of industrial progress.

A. G. A. Committee Exhibits at Atlantic City Convention

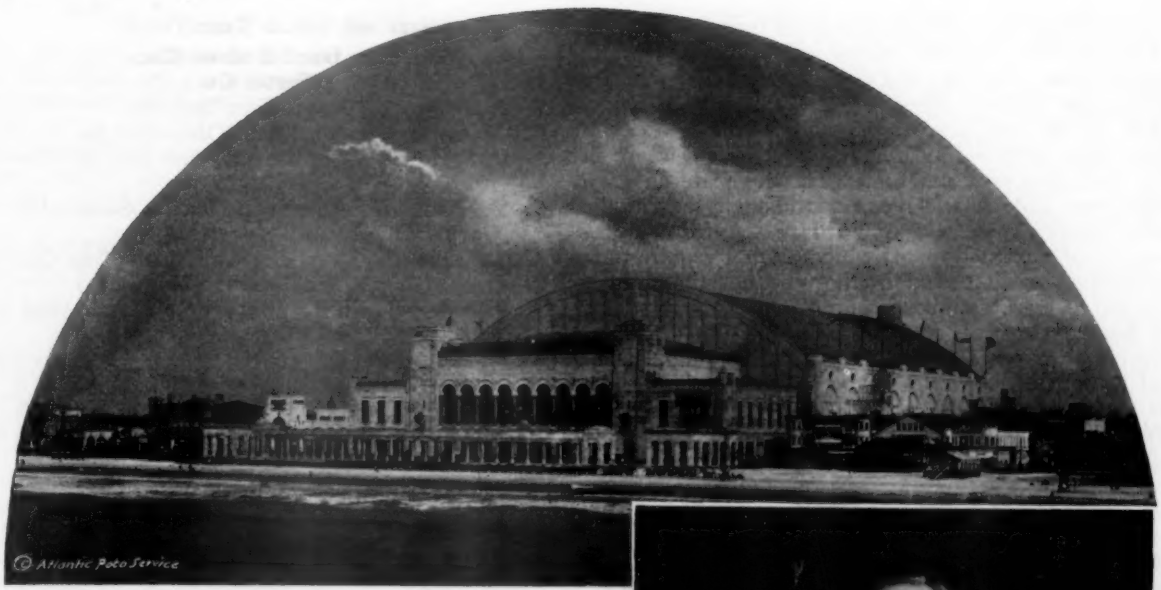


The entire exhibit was 110 feet wide and 34 feet high, including the mammoth A.G.A. letters which were, in themselves, 10 feet high and 18 inches thick. The exhibit was designed and supervised by the Window and Store Display Committee of the American Gas Association

Committee Members

Robert M. Angell
Stuart Bratesman
Raymond V. Clark
George E. Harris
Guy Philip
Vernon E. Shepherd
Raymond M. Martin, Chairman

Photos by Atlantic Foto Service



A. G. A. Meeting of 1929

Annual gathering at Atlantic City sets many records and advances interests of the gas industry

Bernard J. Mullaney
President-elect, American Gas Assn.

APPROXIMATELY 6,000 men and women interested in the advancement of the American gas business participated in the record-breaking convention of the American Gas Association at Atlantic City during the week of October 14. Meeting in the commodious and well arranged quarters of the new convention hall and auditorium, this noteworthy gathering afforded the customary opportunity for exchange of information, attendance at meetings, and viewing of worth-while exhibits.

There can be no doubt that the 1929 convention set a record in effectiveness, perhaps in large measure because of the concentration under a single roof of exhibits and convention meeting places. Even the capacious meeting halls of the new auditorium proved in the case of some of the sectional gatherings inadequate for the attendance; but these minor inconveniences, suffered by a few, were negligible in comparison with the vast improvement of the facilities afforded for both convention and artistic display of appliances and equipment in the splendid hall of this building. As a consequence, gas men generally found it both comfortable and convenient to get about among the exhibits and seemed almost unanimous in their feeling that at no other point in the United States were there equally good facilities for such a combination of meetings and display.

As a consequence of the spring meetings of the various groups dealing with production, distribution, natural gas, and merchandising problems of the business, it proved entirely practicable to curtail the length and to reduce the complexity of the various section gatherings. Due to this, it was possible for those in attendance at the convention to spend a greater portion of their afternoons at the exhibits without neglect of the meetings than has hitherto been possible. Numerous favorable comments were noted on this feature of the convention and the hope expressed that even further development of this idea may be made practicable as

the various spring conferences are perfected.

The influence of such spring conferences was also notable in the character and completeness of committee reports, particularly those of the Technical Section. Many of the sub-committees who had largely completed their work before the Production Conference in May took that occasion to present the material in a preliminary fashion and hence found their task at the annual gathering largely confined to the formal presentation of a printed report which did not require time for reading or discussion in the meetings themselves. This use of the spring conferences as a try-out and the fall Annual Convention as an occasion for formal but brief presentation is the result that is seemingly beneficial to both the spring and the autumn gatherings.

It will be noted in the report of the convention which follows in the pages of this issue of AMERICAN GAS JOURNAL that in many instances it is unnecessary to review at this time committee reports that have already been mentioned in pages of earlier issues. This, however, does not indicate either lack of merit or lack of importance for these reports. Member companies and individuals in the industry should make serious use of these documents practically all of which are conveniently available in the preprinted pamphlets prepared by the Association headquarters staff.

Newly Elected Officers and Directors for 1929-30

President—Bernard J. Mullaney, vice-president, The Peoples Gas Light and Coke Co., Chicago, Ill.

Vice-President—Clifford E. Paige, vice-president, The Brooklyn Union Gas Co., Brooklyn, N. Y.

Treasurer—William J. Welsh, President, New York and Richmond Gas Companies, Staten Island, N. Y.

Directors for 2-Year Term:

H. C. Abell, Electric Bond & Share Co.
J. S. DeHart, Jr., Isbell-Porter Co.
F. C. Freeman, Providence Gas Co.
R. W. Gallagher, The East Ohio Gas Co.
Arthur Hewitt, Consumers Gas Co. of Toronto
F. T. Hulswit, American States Securities Corp.
A. B. Macbeth, Southern California Gas Co.
Fred A. Miller, S. R. Dresser Mfg. Co.
P. S. Young, Public Service Electric and Gas Co.

Section Executives Chosen

Accounting Chairman—J. L. Conover, Public Service Electric and Gas Co.; vice-chairman—J. I. Blanchfield, Brooklyn Union Gas Co.

Commercial Chairman—Geo. E. Whitwell, The Philadelphia Company; Vice-chairman, E. R. Acker, Central Gas & Electric Corp.

Industrial Gas Chairman—C. C. Krausse, Consolidated Gas Electric Light & Power Co.; Vice-chairman—D. W. Chapman, The Peoples Gas Light and Coke Co.

Manufacturers Chairman—F. G. Curfman, Improved Equipment Co.; Vice-chairman—E. S. Dickey, Maryland Meter Works.

Natural Gas Chairman—Henry C. Morris, Dallas Gas Co.; Vice-chairman—H. C. Cooper, Hope Natural Gas Co.

Publicity and Advertising Chairman—James M. Bennett, the United Gas Improvement Co.; Vice-chairman—Donald M. Mackie, Consumers Power Co.

Technical Chairman—B. V. Pfeiffer, United Gas Improvement Co.; Vice-chairman—R. G. Griswold, Cities Service Co.

General Sessions

Market development, research, and public relations of the gas industry receive attention at general gatherings

THE GAS INDUSTRY took account of stock, reviewing its status and progress in research, sales, and the development of its relations with the general public in the three morning gatherings which constituted the "General Sessions" of the annual convention. The net result of these deliberations indicated progress and achievement but made clear the existence of numerous problems still to be solved.

President Oscar H. Fogg, in his address at the opening meeting in recognizing the gratifying record of general progress, pointed out the "significant fact that we are devoting more attention to and studying more critically those lines in which our improvement has been less marked and where the need for greater effort is becoming more apparent. The gas industry is optimistic as to its future, but fortunately ours is not the brand of optimism that unduly colors the facts, and so we are endeavoring to search out our defects and to plan our work in such a way that the industry's concerted effort will be focussed upon whatever weaknesses and deficiencies our diligent self-examination may disclose. It is this spirit—the determination constantly to strengthen and improve—that underlies our far-reaching program of research."

Later in his address the president gave attention to the important recognition which has been given by state authorities to the equity of the principle of an adequate customer charge and the soundness of the three-part rate; but in all public relations he urged the necessity of sound economic considerations such as those which govern business in general. In this connection he emphasized that . . . . . "If that service were not economically right, if it were not worth the price charged, not all the constitutions in the world could guarantee a fair return upon the investment."

"The Industry's Program"

The spirit of research and the spirit of expansion were the keynote of managing director Alexander Forward's convention report in which he reviewed "The Industry's Program." As a measure of the success of the industry, Major Forward presented some of the salient statistics of the business for 1928 in contrast with the preceding year.

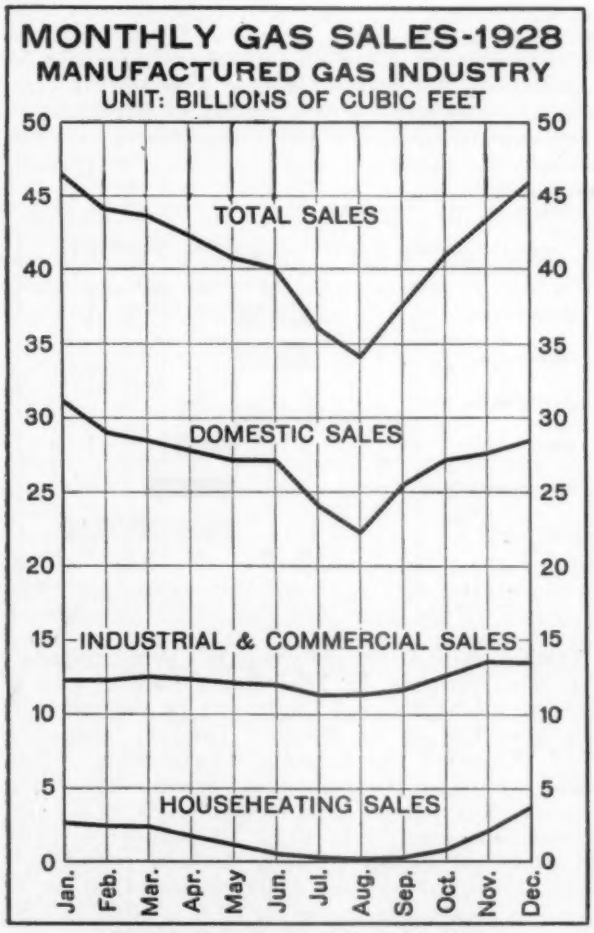


Chart by Paul Ryan, A. G. A. Statistician

"In 1928 the revenues of the gas industry aggregated $882,000,000, an increase of nearly 8% over the preceding year. At the close of 1928 its customers numbered 16,000,000, a gain of more than 500,000. To the service of these customers was dedicated an investment estimated at $4,750,000,000."

The closer affiliation of manufactured gas and natural gas interests through the merger of the natural gas group in the A. G. A. was emphasized as a very important achievement, the beneficial results of which are being realized in full for the first time during the past association year. Major Forward pointed out that among the greatest increases in public utility gas supply had been those of the natural gas branch of the business with a second important increase in the amount of coke oven gas distributed, both that produced by utilities themselves and that purchased from by-product oven plants owned by merchant-coke or steel companies. Other statistical high lights of the industry presented by Major Forward included the following significant paragraphs.

"The manufactured gas industry delivered 92.5% of the gas it makes to the customer, our unaccounted for having reduced to 7½%.

"At the close of 1928 the manufactured gas industry in the Dominion of Canada served 500,000 customers, an increase of nearly 9% during the year, while the investment dedicated to these patrons aggregated more than $62,000,000. Over 16,000,000,000 cu. ft. of gas were manufactured during 1928, representing an increase of almost 8% over the preceding year.

"In 1928 the operating revenues of the industry increased 3%, while operating expenses decreased more than 1%, affording striking testimony to the soundness and efficiency of the study and research which have been devoted to the problem of lowering production costs.

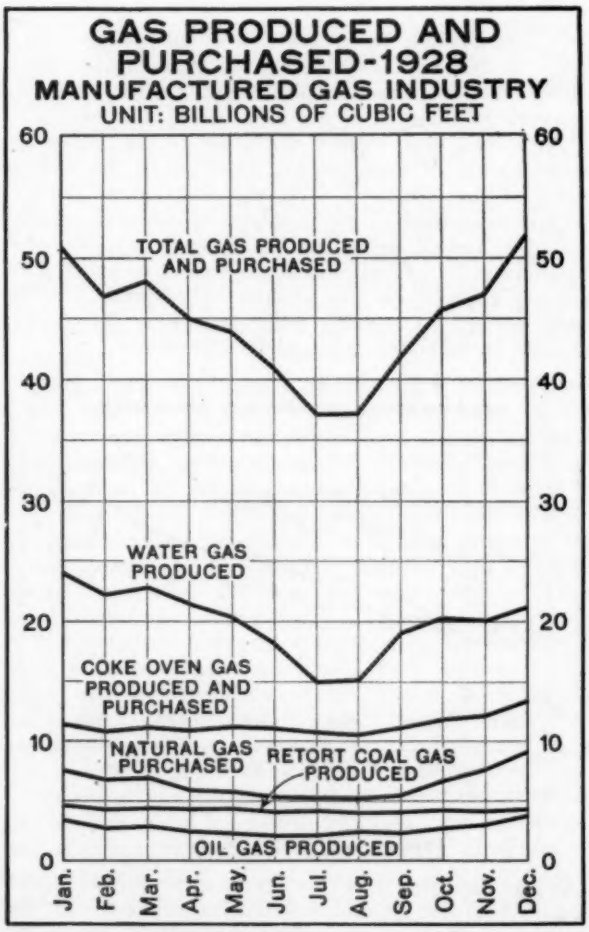


Chart by Paul Ryan, A. G. A. Statistician

"Taxes paid by manufactured gas companies in 1928 aggregate $51,000,000, representing an increase of 35% since 1923, as compared with an increase in other operating expenses of only 12 per cent since that date. In 1923 taxes absorbed 8.7% of operating revenues, but in 1928 almost 10% of the operating revenues of the industry were required for tax payments.

"In 1928 operating expenses per thousand cu. ft. sold were nearly 4 cents less per unit than for the preceding year. It is of great interest to note the manner in which these economies effected by the increasing efficiency of management were about evenly distributed between consumers and stockholders. In 1928 the industry collected on the average nearly 2 cents less for

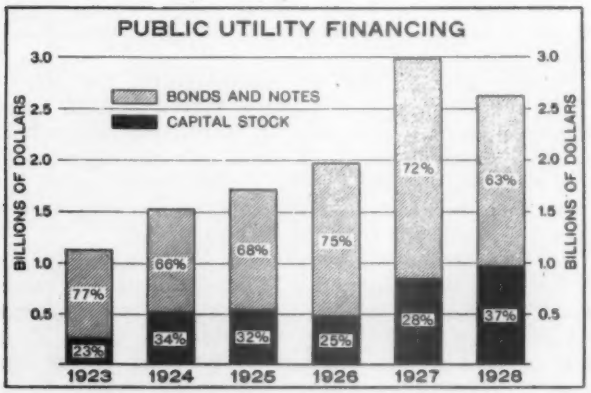


Chart by Paul Ryan, A. G. A. Statistician

every thousand cu. ft. of gas sold to consumers than in 1927. At the same time there was available for stockholders' dividends and surplus about 2 cents additional for every 1000 cu. ft. of gas sold during the year.

"Such data bear witness not alone to the ability and determination of management to utilize to the full the results of the industry's far-flung program of research and study devoted to the problems of lowered production costs and of new uses for our product, but more important still, they emphasize the extent to which management appreciates and accepts its responsibility for public service by sharing with consumers the savings achieved by increased managerial efficiency."

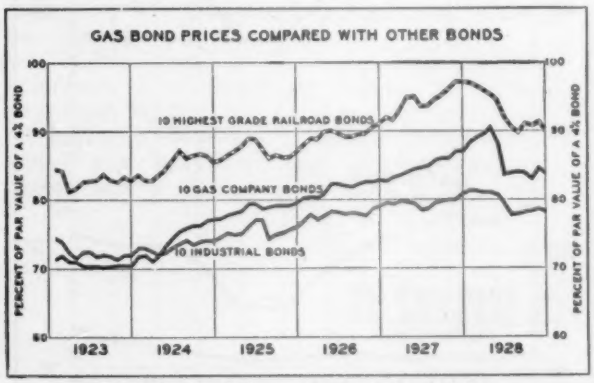


Chart by Paul Ryan, A. G. A. Statistician

Organizing for Safety

Among the three important general committee reports presented to the general sessions in abstract was that of the committee on accident prevention which has worked during the past year under the chairmanship of E. J. Kreh. This committee reports with pleasure the safety record of the industry as a whole. It cites the data reported to the National Safety Council which show that the lost time accidents per million hours worked by gas company employees were reduced from 35.6 to 23.3 between 1926 and 1928. This reduction of approximately 34% compares favorably with the reduction made in other industries reporting as on the average they have been able to make only a 26% improvement.

Working through its various subcommittees this association group has stimulated a wide variety of work and has drafted a substantial number of safety regulations dealing with starting, charging, cleaning, and repairs to water gas machines, operation of condensers, scrubbers, and other gas handling equipment and meters and it cites for the guidance of the industry also safety regulations for boiler and power plant work. Another subcommittee has dealt with the construction and maintenance of transmission lines particularly those in the natural gas fields and presents rather a comprehensive set of good-practice rules to guide the industry.

In further stimulation of safety work this committee has acted upon a large number of applications by companies for a meritorious service medal or McCarter medal award. As a result of its efforts there was included in the Wednesday evening program the ceremony of presentation of these medals for life saving to a representative group of individuals from the number to whom the award has been made since the previous convention.

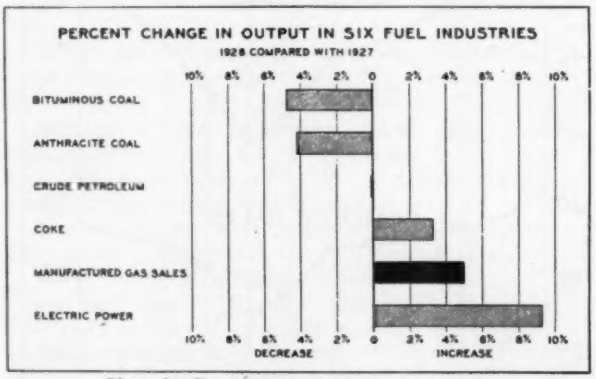


Chart by Paul Ryan, A. G. A. Statistician

Another phase of the gas company's public responsibility was discussed by Miss Laura Cauble, who is chairman of the National Conference on Sanitation in New York City, in an address, "The Gas Company's Social Obligation and Economic Opportunity." Miss Cauble pointed out that government agencies have made vigorous effort to insure pure food although the average individual consumes only about 5.5 pounds of liquid and solid food per day. During the same period such typical individual breathes 2,000 gallons of air or 34 pounds of atmosphere that in big cities is often seriously polluted. The indirect effect of atmospheric pollution and smoke in reducing the effective sunlight reaching the individual was also emphasized. Miss Cauble cites this situation both as an *opportunity* of the gas industry to accomplish heating service without smoke and atmospheric vitiation and a *duty* to put forth vigorous effort in the protection of the public.

Gas Competition

The strong competition of other heating materials with gas were recognized and the problems of selling under these conditions were discussed by George E. Whitwell, vice president in charge of sales of the Equitable Gas Company, Pittsburgh. Some of the high lights of Mr. Whitwell's remarks follow.

"Fundamentally, I believe that the best sales method any gas company can have is the inculcating in its entire personnel of a whole-hearted interest in and understanding of the necessity for selling.

"The method used to reach the employees is non-essential. The all-important factor is the necessity for

creating in the employee a sympathetic and complete understanding of the necessities of the Sales Department so that he may be counted upon to do his bit. There can be no better slogan, in my opinion, for any gas company than the one that states 'Every Employee a Salesman.'

"Then there is the second fundamental—the price of the commodity. For years, no convention of gas men has been complete without a great deal of discussion of rates.

"The third fundamental is, undoubtedly, quality of gas service. We cannot, therefore, be content with stopping our efforts at the meter but must extend our jurisdiction so that it covers the appliance and its installation. The best gas service fails if the cooking range and water heater are obsolete or inefficient or perhaps even unsafe; it does not reach its goal if the house heating equipment is poorly designed or, if properly designed, is improperly installed; it will undo all other successful sales effort if the commercial or industrial installation does not take full advantage of the most advanced engineering knowledge."

Gas-Load Building

Sales of gas may be increased by securing new customers or by increasing the consumption of existing customers. Recognition of these two possibilities was given as the first step in the argument of Samuel Insull, Jr., in his address on "Economics of Load Building." But he promptly went on to the second step of his argument which emphasized that the intensive expansion of business among present consumers is really the important consideration for any public-utility company.

Mr. Insull advanced the argument that a proper arrangement of rate structure is the most important consideration in further sales promotion among existing customers. He argued strongly against at any time *raising* the price of gas to any class of customers when this can possibly be avoided. Although he pointed out that there are times when rates must be raised, those times should be regarded as important only for elimination of discrimination or for correcting a situation that gives inadequate return upon capital. As a matter of sales promotion only *reductions* of rates can be considered as a factor; readjustment with raises to certain classes of consumers are not a proper part of any sales promotion program, even though they may result in lowering of prices to other classes of users. In this connection he said:

"Mass psychology, not economics, will so determine the gas company, therefore, while furnished with better means to induce the customer to buy gas, will build up a sales resistance resulting from the general opinion that the product has become more expensive.

"To sum up, therefore, one might say that a rate proposition designed to promote sales, in addition to reducing the unit cost as the consumption increases, should not increase it if consumption remains the same. Economics may exclaim that such a proposition is unsound, but mass psychology reiterates that sound or unsound in theory, in practice it alone is workable."

As an argument regarding the efficiency of expenditures in lowering gas rates accompanied by sales promotion and advertising Mr. Insull described an experiment which has come under his personal attention, as follows:

"The experiment was tried in two neighboring cities of about the same population and buying power. In the first, an optional rate was offered, which did not increase the cost of gas to any consumers, and reduced it to certain of the consumers who would increase their consumption. In the second town, no readjustment of the rates was made, which, however, were already on a fairly standard sliding-scale block basis. In both towns, a like amount of advertising was displayed and in both towns sales effort was accelerated. In the second community, however—that in which no inducive rate was offered—an amount equal to the annual reduction that would have resulted from the installation of such a rate was used in accelerating to an additional degree the sales activity through the increase of commissions to salesmen and an increase in the number of salesmen. Relative figures of consumption are available, but were disregarded as affected principally by conditions existing prior to the experiment.

"The sales, however, of certain types of load-building equipment by the gas company were recorded. In both towns, the self-action gas water heater was concentrated upon as the greatest medium of building consumption. In the first town where the rate was in effect, 457 of these pieces of equipment were sold during the first year by the gas company alone; whereas, in the second community, there were sold only 214. This fact is more of an indication than a proof. Its significance, however, is marked.

"On the subject of rates, therefore, the suggestion is offered that the proposition of reducing rates to the more than average consumer, without increasing them to the less than average consumer, should be considered along with an advertising campaign and an increase in sales effort. Such a readjustment of rates is not, however, as unsound economically as it may appear when the temporary loss in revenue is considered as a selling expense; moreover, the loss is not recurrent and disappears when the consumption is secured.

"The sales of the gas industry are constantly increasing. The efficiency of production improves. The average net return on investment is already increasing year by year. A time approaches when all the average gas companies will be earning a fair return on the property used in the public service. In some cases, this time is reached at the present moment. But the need for sales activity from the selfish point of view of the gas company does not decrease as the point of adequate return is approached. When this point is reached, it is possible to make a general reduction of the gas rate throughout the community served, affecting a majority, if not all, of the consumers.

"Each time that this is done, the relative expenditure of the home for gas service is decreased. The percentage of the domestic budget allocated to the gas bill is lessened. If the gas bill is treated as a luxury, it becomes less of a luxury and more of a necessity. If it is already a necessity, it becomes one of less moment from a financial point of view."

Gas Research

In order to review the position "Where the Gas Industry Stands in Research," Mr. Walter C. Beckjord presented a full review of the investigations, both technical and economic, which have been under way and

are projected by the gas industry. He set forth the economic necessity of research and stated numerous examples of the benefits already achieved by the enlargement of the research program of the A.G.A. His remarks also presented some of the management problems involved in adapting results of research to a practical industrial operating basis. And despite the limitations and difficulties which preclude immediate translation Mr. Beckjord points out that management must not only do, but utilize the results of scientific engineering and economic investigation. He concluded his paper with the following appeal:

"Research and success are closely related. A study of the history of mankind as well as of industrial progress will show that the man or the unit of industrial organization that has achieved success is the one that has done the most original and courageous thinking. It is much easier to follow than to lead, but following blind leadership is apt to be disastrous. Success has been defined in many ways, but its elements must include knowledge of the business, courage, activity, and talent for human relationship, or in other words, organization. Research is closely interwoven with all these elements and certainly it is a definite part of every one of them.

"Research is absolutely essential to the progress and success of any industry. It should be a fundamental part of every program of development. The growth and expansion of the immediate future are important, of course, but it is the five and even ten-year plan for the future which really makes for the ultimate success or failure of any industry.

"The gas industry must be prepared to face constantly changing conditions. It is no different from any other in that respect. It must contribute to scientific development through research in theoretical applications and not so much by following the traditions of the past. The programs of research now under way are broad and far reaching in their scope, but they are only a beginning of the programs which must be adopted if the gas industry is to take and hold its proper place among the industries of this nation."

Award of the Charles A. Munroe medal of the A. G. A., which is made annually for outstanding service to the gas industry, was given this year to Mr. Nils T. Sellman, assistant to the vice president in charge of sales and utilization, Consolidated Gas Company, New York City. The cash award and the medal, available through the generosity of Mr. Charles A. Munroe, the well known gas engineer, was awarded to Mr. Sellman because of the pioneering effort he has made in the further development of the gas refrigerator.

Technical Section

Carbonization, Water-Gas, Chemical, and Distribution committees join with speakers on butane enrichment, gas dehydration, and chemical engineering in engineering sessions

ECONOMIC and engineering considerations for further development of production and distribution of gas were intermingled in the meetings of the technical session of the Association. The immediate conclusions and recommendations of the committee on economic and engineering survey of the gas industry formed, of course, one of the highlights of this discussion. They will be reviewed in a subsequent number of *American Gas Journal* and an attempt will be made at that time to interpret them rather fully editorially. The present report summarizes the highlights from the balance of the program.

Carbonization Committee

The Carbonization Committee report for the year 1929 follows the general line of the reports of previous committees. A three-day Production and Chemical Conference was held in Baltimore, Maryland, on May 27, 28, and 29, and the programs for the afternoon session on the 27th and the morning session on the 29th were in charge of this committee.

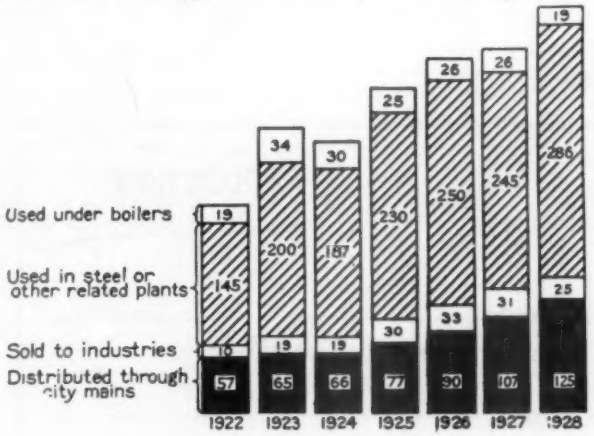
B. V. Pfeiffer,
Chairman-elect, Technical Section

The conference papers have been largely printed in this committee report and some have been enlarged in the light of further data collected since the Baltimore meeting and others have been revised to include the discussions brought out when they were presented. All engineers interested in gas production are urged to get a complete set of the sub-committee documents, as they form an important resume of present activities in the field of coal carbonization.

Carbonization Test Code

Great interest has been shown in the carbonizing plant test results published in the 1926 and 1927 Carbon-

ization Committee reports. These tests were based on the Test Code as presented in the 1924 Carbonization Committee report and have proved to be very valuable as a reference. However, it has been felt by many that all the reports which have been made on the subject could be put into a more usable form making them even more valuable to the industry. Accordingly this committee was appointed to carry out the program.



DISPOSITION OF SURPLUS COKE-OVEN GAS, 1922-1928

Gas used in heating ovens or wasted is not included, figures in bars represent billion cubic feet

It is the ambition of the committee to give to the Association a workable code which every progressive operator will want to use. It will be in manual form and will consist of the following:

"1. Correct methods of sampling and collecting data.

"2. Table of constants necessary.

"3. Discussion of assumptions which must be made and probability of errors.

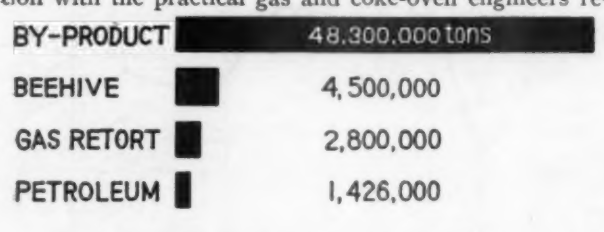
"4. Method of calculating a complete heat balance.

"5. Revised plant test run by 1926, 1927 Carbonization Committee."

To do this will require considerable careful study and work, and for this reason the committee will promise no definite date at which the final report will be available.

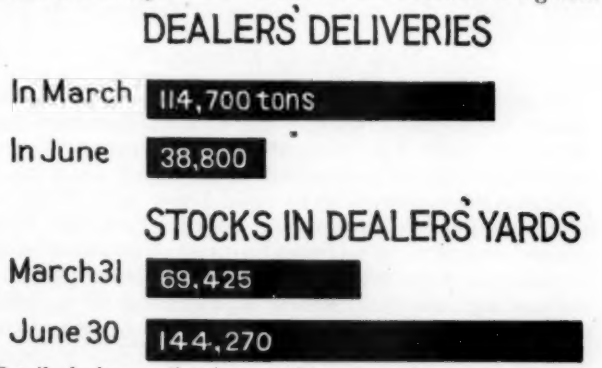
Survey of Coking Coals

"The work of last year's committee on Survey of Gas and Coking Properties of American Coals consisted of a study of methods now in use for determination of the gas and coke-making properties of coal, and consultation with the practical gas and coke-oven engineers regarding test requirements. A report of this investigation is included in the Carbonization Committee report of 1928 to the American Gas Association. This year's work, which is still in progress, has consisted in the development of apparatus and procedure for moderate-scale testing. The present paper is in the nature of a progress report wherein the apparatus devised is described and significant results so far obtained are given.



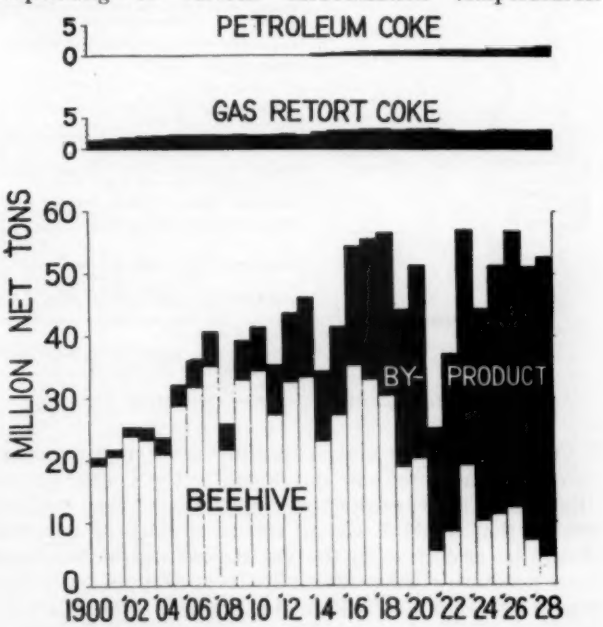
GRAND TOTAL 57,026,000 tons

Total Production of Coke 1928
Coke Economics Exhibit of U. S. Bureau of Mines



Retail dealers assist in carrying seasonal storage of coke. Chart summarizes experience of 429 retailers handling coke in March and June, 1929
Coke Economics Exhibit of U. S. Bureau of Mines

"Further work with the test equipment described in this report is required to determine more closely the variations in yield and character of products corresponding to various carbonization temperatures.



PRODUCTION OF COKE OF ALL KINDS IN THE UNITED STATES, 1900-28

Coke Economics Exhibit of U. S. Bureau of Mines

Other known coals should be tested and perhaps different retort shapes should be experimented with before proceeding with the actual survey work. However, at the present stage of the work the following conclusions seem to be warranted:

"1. With a carbonization scale such as this (70 to 90 lbs.) it is possible to obtain accurate quantitative recovery of products.

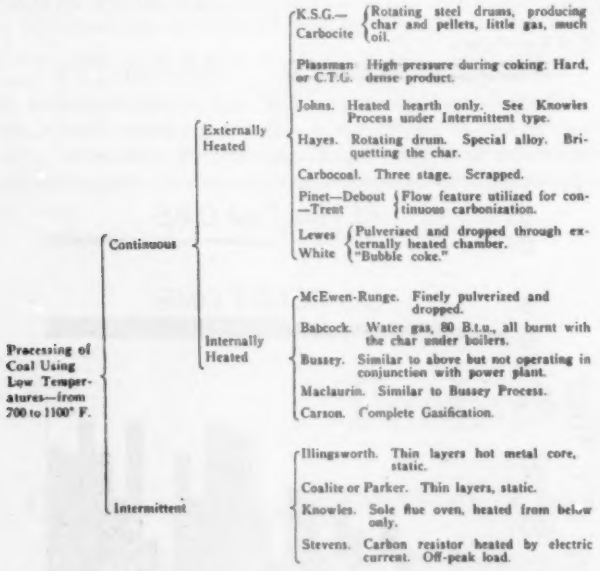
"2. With proper adjustment of the carbonization temperature the quality of the products obtained approaches closely to that of industrial-scale products.

"3. The test yields are within the range of figures obtained in industrial practice, no correction factors being required.

"4. The quality of the coke, in particular, is surprisingly good considering the scale of test and the retort shape. The most encouraging feature is its uniformity."

New Coking Methods

In presenting his "Present-Day Analysis of Carbonization Problems" Professor S. W. Parr discussed and classified many low-temperature carbonization processes which have been proposed or developed. His chart grouping these according to their major characteristics shows the interrelationship very clearly, Professor Parr pointed out that in addition to these low-temperature processes and the several commercial high-temperature carbonizing schemes there is a possibility of a "mid-temperature carbonization" using temperatures from 1200 to 1500° F.


Processing of Coal Using Low Temperatures—from 700 to 1100° F.
Continuous
Intermittent
Externally Heated
Internally Heated
K.S.G.—Carbocite — Rotating steel drums, producing char and pellets, little gas, much oil.
Plassman or C.T.G. — High pressure during coking. Hard, dense product.
Johns. — Heated hearth only. See Knowles Process under Intermittent type.
Hayes. — Rotating drum. Special alloy. Briquetting the char.
Carbocoal. — Three stage. Scrapped.
Pinet—Debout—Trent — Flow feature utilized for continuous carbonization.
Lewes—White — Pulverized and dropped through externally heated chamber. "Bubble coke."
McEwen-Runge. — Finely pulverized and dropped.
Babcock. — Water gas, 80 B.t.u., all burnt with the char under boilers.
Bussey. — Similar to above but not operating in conjunction with power plant.
Maclaurin. — Similar to Bussey Process.
Carson. — Complete Gasification.
Illingsworth. — Thin layers hot metal core, static.
Coalite or Parker. — Thin layers, static.
Knowles. — Sole flue oven, heated from below only.
Stevens. — Carbon resistor heated by electric current. Off-peak load.

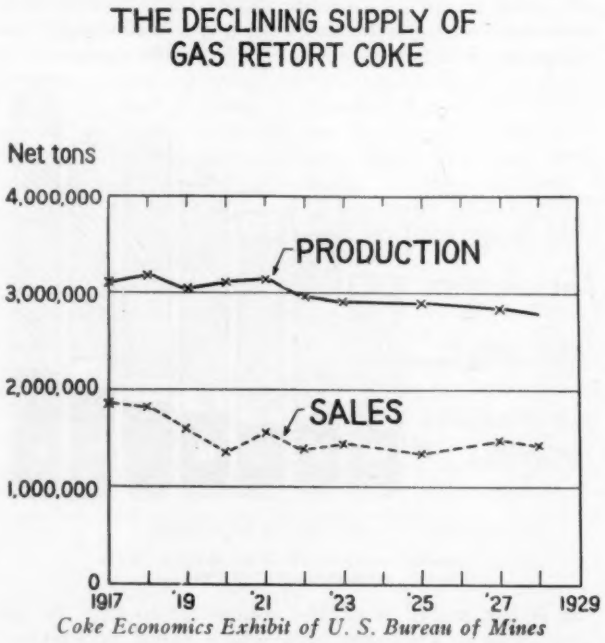
S. W. Parr's Classification of Low-Temperature Processes

Only one project makes specific use of this temperature and that is the one developed at the University of Illinois. "The fundamental objective in the working out of that method was to secure a yield of gas that would be attractive to the gas maker and at the same time produce a coke especially from Illinois coals that would be readily salable in the domestic market or directly available for complete gasification or for power purposes."

Professor Parr analyzes rather fully the economic relationship of this mid-temperature scheme both to the gas industry and to the power-producing business. He concludes that whether there be any immediate opportunity to apply such a process commercially with financial success there is ground for answering his own question by saying. "There certainly is something in it for the gas man—at least to think about."

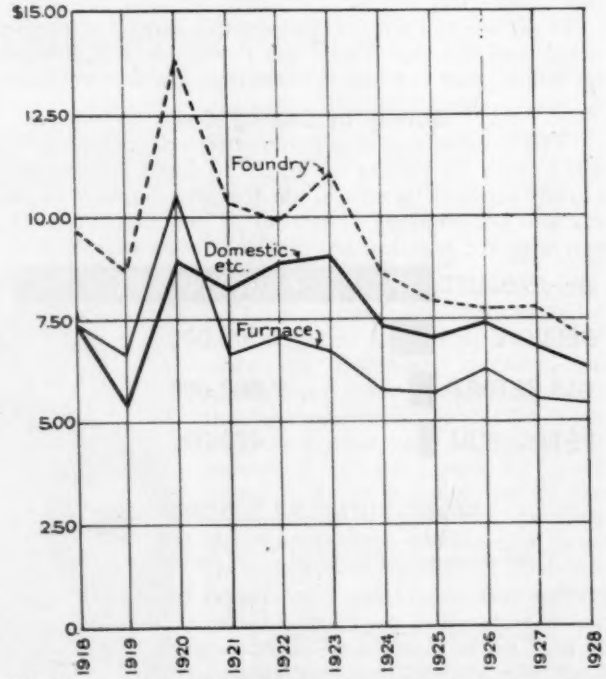
New Plants

In its customary report the Builders' Section of the Carbonization Committee reports on the recent developments in new plant construction carried out by six concerns among those represented on this committee. Among the reports are that of the International Coal Carbonization Company, by Walter Runge, who describes briefly the low-temperature plant near New Brunswick which utilizes the K-S-G process. (This plant has previously been described in AMERICAN GAS JOURNAL.) The other sections of the report deal with new installations and developments by Koppers, Parker-Russell, West Gas, Improved Equipment-Russell Engineering, and United Engineers and Constructors.



Coke Economics Exhibit of U. S. Bureau of Mines

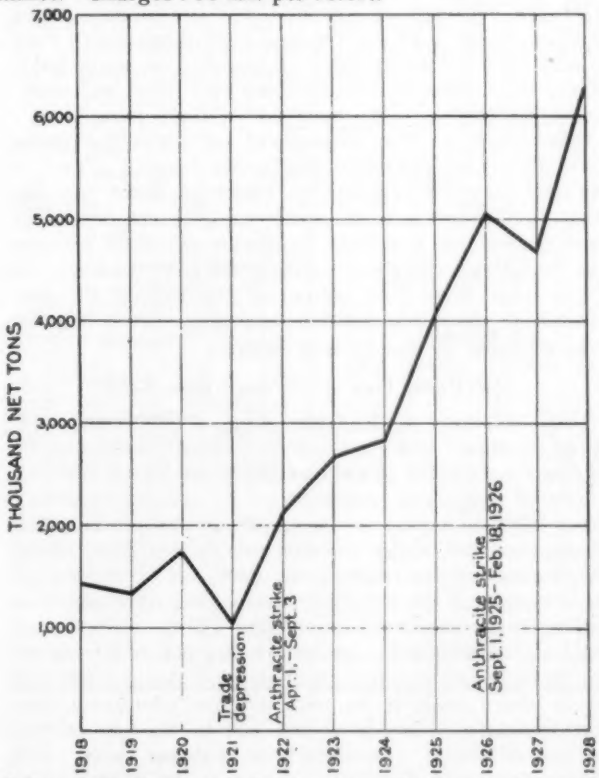
Among the interesting engineering features of the subcommittee report is an analysis of a hypothetical situation where partially and completely mechanically operated plants are compared by F. G. Curfman. The tabular and text comparison which he makes in the form of a time study and analysis of through-bench installations under two sets of conditions are as follows:



Coke prices are trending downward. Curves show average realization on By-Product Coke sold, 1918-1928
Coke Economics Exhibit of U. S. Bureau of Mines

"Schedule A—Hand charged, machine discharged: Coal is elevated to a 50-ton bin by a bucket elevator which is fed by hand; the coal is drawn by hand into the charging buggies, the buggies are drawn by hand to the charging floor. The retorts are hand charged and pushed by an electrically driven ram. Thirty-six retorts, 11 ft. 6 in. throughs. Charges 550 lbs. per retort.

"Schedule B—Complete machine operation: Coal is fed by hand or direct from railroad car to a new crusher, thence to the existing bucket elevator and to the existing 50-ton bin. It is drawn from the bin into a new flight conveyor and delivered to a new small hopper in the retort house, from which it is drawn into the four-compartment bin of the new charging machine. Same retorts charged and discharged by machines. Charges 750 lbs. per retort.



Sales of By-Product Coke for domestic use are increasing rapidly

Coke Economics Exhibit of U. S. Bureau of Mines

"From an analysis of this study it is to be noted that there are a number of very definite and exact tangibles in the form of immediate monetary return to be obtained by complete machine operation. In addition, there are many other decided benefits which are not indicated in the accompanying analysis, some of which are as follows:

"First: Machine charging of retorts eliminates the employment of men having the necessary physical strength and skill for stoking retorts; the absence of the regular operators from the retort house will work less hardship, as these machines can be operated, if necessary, by men with no previous experience. In other words, the Superintendent will have a wider selection in the employment of help required.

"Second: Because of the increased gas-making capacity per bench, it will become possible to operate fewer benches if desired, thus increase the availability of bench operators for other work and decrease the maintenance cost on the bench battery. As the benches, by machine charging, will carbonize more coal per lineal foot of retort length, and because of the exact control of the charging operation as to proper placing of any weight of charge desired, there will be greater controlled flexibility of gas making capacity per bench by the machine method of operation. This point will undoubtedly be found to be of considerable advantage in meeting the peak loads. Light or heavy charges can be placed in the retorts with consistent uniformity at the will of the operator.

"Third: Due to finer grind and heavier and better laid charges, the machine charged coal produces a coke of greater density, less friable and of more uniform structure and with an attendant decrease of breeze, than the lighter and more irregular hand thrown charges.

"Fourth: As the result of better laid and heavier charges the possibilities of making naphthalene and pitch will be reduced and a better grade of tar will be produced.

OPERATING SCHEDULE		A	B
1. Number of retorts		36	36
2. Charges—per retort per day		4	4
3. Charges—total per day		144	144
4. Charges—weight—lbs.		550	750
5. Total weight coal per day—tons		39.6	54
TIME SCHEDULE		**A**	**B**
6. To open mouthpiece and spot pusher, push and withdraw ram	min.	3.27	1.55
7. Charge and close mouthpiece	min.	2.5	1.50
8. Time mouthpiece is open—per charge	min.	5.77	3.05
9. Total time mouthpieces are open per day	hrs.	13.85	7.32
10. Total operating time per day retort	hrs.	864	864
11. Total actual carbonizing hours per day		850.15	856.68
12. Actual carbonizing periods	hrs.	5.90	5.95
POWER SCHEDULE		**A**	**B**
13. Crusher kw.hr. per day			17.00
14. Bucket Elevator kw.hr. per day		5.15	7.02
15. Flight Conveyor kw.hr. per day			9.00
16. Pusher kw.hr. per day		2.88	3.91
17. Charging Machine kw.hr. per day			19.00
18. Total kw.hr. per day		8.03	$5.93
19. kw.hr. per charge		0.056	0.388
20. kw.hr. per ton coal carbonized		0.203	1.036
21. Increased kw.hr. used per ton coal			0.833
LABOR SCHEDULE—PER DAY		**A**	**B**
22. Pushing and charging	hrs.	13.85	7.32
23. Put coal from cars to bin	hrs.	7.00	5.00
24. General bench and producer attendance	hrs.	5.00	5.00
25. Actual labor hours per day operating benches	hrs.	25.85	17.32
26. Labor hours less required due to machine operation	hrs.		7.53
27. Percentage saving of labor hours by method "B"	%		33%
28. Number of machine men per shift			1
29. Number of stokers—men per shift		3	1
30. Number of coal men (1 shift only)		1	
31. Shifts—2 per day	hrs.	12	12
32. Payroll hours per day	hrs.	84	48
33. Payroll cost per day		$26.76	$17.52
34. Saving in payroll—per day			$ 9.24
35. Saving in payroll—per day	%		35%

NOTE: Machine men at 40¢ per hour.
Stokers at 33¢ per hour.
Coal men at 25¢ per hour.

PRODUCTION SCHEDULE (6 BENCHES)		A	B
36. Gas yield per lb. coal (850.15 carbonizing hrs.)	cu.ft.	6.25	
37. Gas yield per lb. coal (856.68 carbonizing hrs.)	cu.ft.		6.30
38. Gas make per day per bench, cu.ft.	M	82.45	113.33
39. Gas make per day, cu.ft.	M	495	680
40. Increased make per day, cu.ft.	M		185
41. Increased make per day, cu.ft.	%		37%
SAVING EFFECTED IN GAS COST		**A**	**B**
42. Labor cost per M (33 & 40)	cents	.0541	.0258
43. Saving in labor cost per M	cents		.0283
44. Saving of 25c ton of coal per M	cents		.0198
45. Total saving over "A" per M	cents		.0481

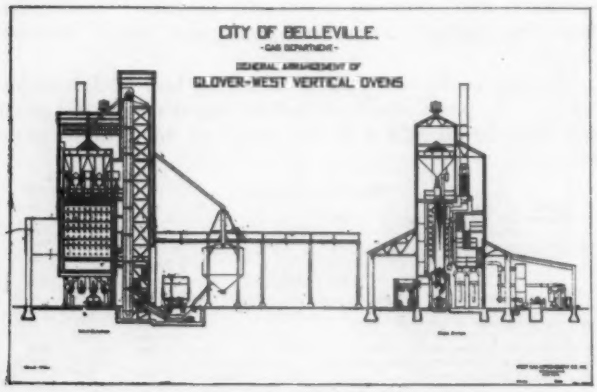
"Fifth: The registered yield of gas per pound of coal carbonized will be increased due to the fact that the mouthpiece doors will be open a shorter time per charge; this is most noticeable by a comparison of "A" and "B" item, No. 9, wherein it will be noted that when operating thirty-six retorts the mouthpieces are open a total of six and one-half hours per day less with machine charging than with hand charging. This occurs at the most vital period of the charge and when the gas B.t.u. is greatest."

Novel Coal Storage

In his section of the builders' report G. W. Parker describes briefly the somewhat novel coal-handling

equipment, analagous to that used in power plant work, which has been installed by his company in connection with the revamping of the London, Ontario, Gas Company plant.

"This equipment consists of track hopper, pan conveyor, and crusher as in the usual construction. The crusher discharges into foot of chain elevator, which discharges into a steel cone placed in the top of a 20 by 60 ft. silo. This silo is of radial tile construction with reinforcing rings built in between courses. The cone at the top has a capacity of 60 tons and is termed "live" storage and is fed from a spout at bottom to a screen conveyor, fed by a reciprocating feeder, and this conveyor discharges into the hopper on charging machine.



Small Capacity Coal Gas Plant

"When cone becomes full and coal continues to flow, the excess runs over the edges of the cone and drops into the bottom of the silo which has a capacity of 360 tons or a total of 420 tons in the silo. When coal is needed in the cone, the bucket elevator is operated, and coal from the bottom of the silo is again elevated to the cone. This arrangement gives practically the entire 420 tons available as "live" storage. The only drawback to this system would be the possibility of spontaneous combustion, but if this did happen, the elevator could be operated and the coal spouted to the outside. However, with a good grade of coal, this condition would hardly exist.

"The general all-around results from this installation are very satisfactory, low labor costs and high yield, equaling plants of this capacity of much higher original investment."

Vertical Oven Results

Since installation of three plants of the Stettiner intermittent vertical-chamber ovens by the U. G. I. Contracting Company rather full operating results have been had. These are presented by Mr. C. A. Schlegel, based on typical operations for about a year of successful performance of the plants.

	Racine	*Dubuque*	*Clinton*
Corrected gas made per 24 hrs. (60°/30") ....M cu. ft.	3,030	698	594
Weight of coal as charged per c.f. uncompacted....Lb.	50	50	49.1
Coking time (valve open to valve open) .....Hrs.	12	12.38	12
Corrected gas per lb. of coal as received .....Cu. ft.	7.36	6.32	6.595
Corrected gas per lb. of dry coal .....Cu. ft.	7.64	6.44	6.852
Calorific power .....B.t.u.	524	560	543
Heat Units in gas per lb. dry coal .....B.t.u.	4,005	3,605	3,721
Coke yield .....%		68.4	
Moisture in producer fuel .....%	19	8.71	12.22
Dry producer fuel/ton coal as charged .....Lbs.	329	235	257
Steaming time per charge .....Hrs.	3	3	3

Water-Gas Report

The Water-Gas Committee, which has operated through a considerable number of sub-committees during the past year, reported very fully at the convention and included in numerous of its sub-committee pamphlets in full text material presented in a preliminary way at the Production Conference last May. Thus the results on low-gravity water gas, steam decomposition in water-gas sets, new developments in mechanical water-gas equipment, and information regarding use of bituminous coal for water-gas manufacture are made available. The other sub-committees reporting included a larger amount of new material in their pamphlets.

Discussion of the adjustment of water-gas manufacture to new economic conditions formed a part of the new material presented. These problems included both a consideration of lower capital cost for peak-load production and also a consideration of utilizing idle peak-load equipment during off-peak seasons. On the first of these two phases of the subject the sub-committee promises further investigations along the lines outlined in this present report.

Off-Peak Use of Water Gas Sets

With reference to the latter phase, a committee made up of chemists and chemical engineers points out the continuance of the inherent difficulties which preclude adapting water-gas machinery to synthetic-chemical plant work as a part of the public-utility gas business. This committee, under the chairmanship of A. C. Fieldner, concludes that there is no prospect of use of off-peak water-gas capacity for the making of alcohols or hydrogen for synthetic ammonia. They discuss very fully the problems of catalytic manufacture of enrichers from water gas and conclude that the alcohols and ethers which could be so made are less promising, even than methane. They point out that both economic and thermal-efficiency considerations indicate very little prospect in this direction, even for the manufacture of methane enrichers.

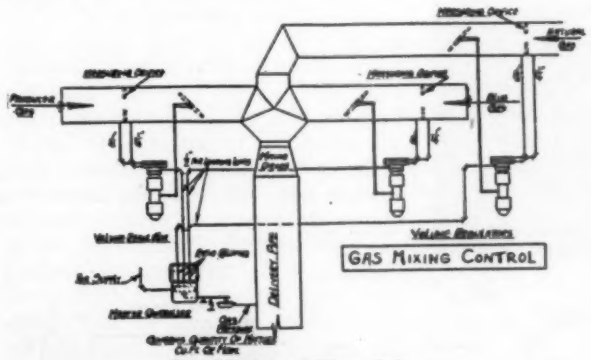
The utilization of oxygen in gas manufacture is discussed by a sub-committee under the chairmanship of L. E. Knowlton. This sub-committee concludes that the manufacture of oxygen at a price which would make its use economical for gas manufacture seems at present improbable. The sub-committee does, however, report definite experimental data obtained in the small-scale producer operation by the General Electric Company, at Schenectady. In these experiments it was found that 335 cu. ft. of oxygen plus 142 cu. ft. of air and 23.5 pounds of fuel and 62.6 pounds of steam were consumed per M. manufactured. The resulting gas was 285 B.t.u. With the all-oxygen blast the results corresponding were 277 cu. ft. of oxygen, 23.5 pounds of solid fuel, and 59.8 pounds of steam to give a gas of 297 B.t.u.

In accordance with its promise the sub-committee on water-gas text code presented a very full report outlining the data which must be gathered and the general

basis of calculation recommended for complete efficiency tests of water-gas plants.

Gas Mixing

The result of mixing natural and manufactured gas at many works has been development of a variety of devices and methods, all of which are discussed by the sub-committee on this subject working under the chairmanship of E. A. Munyan. This committee concludes that each of the methods has its individual advantages according to local circumstances and recommends that gas engineers make a thorough study of this subject while the problems are still in their infancy in order that they may most advantageously adapt existing equipment or develop new forms of apparatus suitable for this work. Simply as a sample of one mixing method which is discussed by the committee, there is included the diagram of the scheme used at New Orleans for mixing natural gas, blue gas, and producer gas to prepare the city-gas sendout.



Gas Mixing at New Orleans

Because much of the new equipment in the water-gas field had been considered by other sub-committees, the report of the Builders' Section of this Committee was this year very brief. The U. G. I. engineers in their section of the report described and gave results for their latest type of mechanical generators, including the following data for a ten-day test run at New Bedford:

Net Fuel per M.	26.5 lbs.
Oil per M	3.34 gal.
B.t.u.	542
CO_2 in Finished Gas	3.6 %
Combustible in Ash	0.3 lb. per M

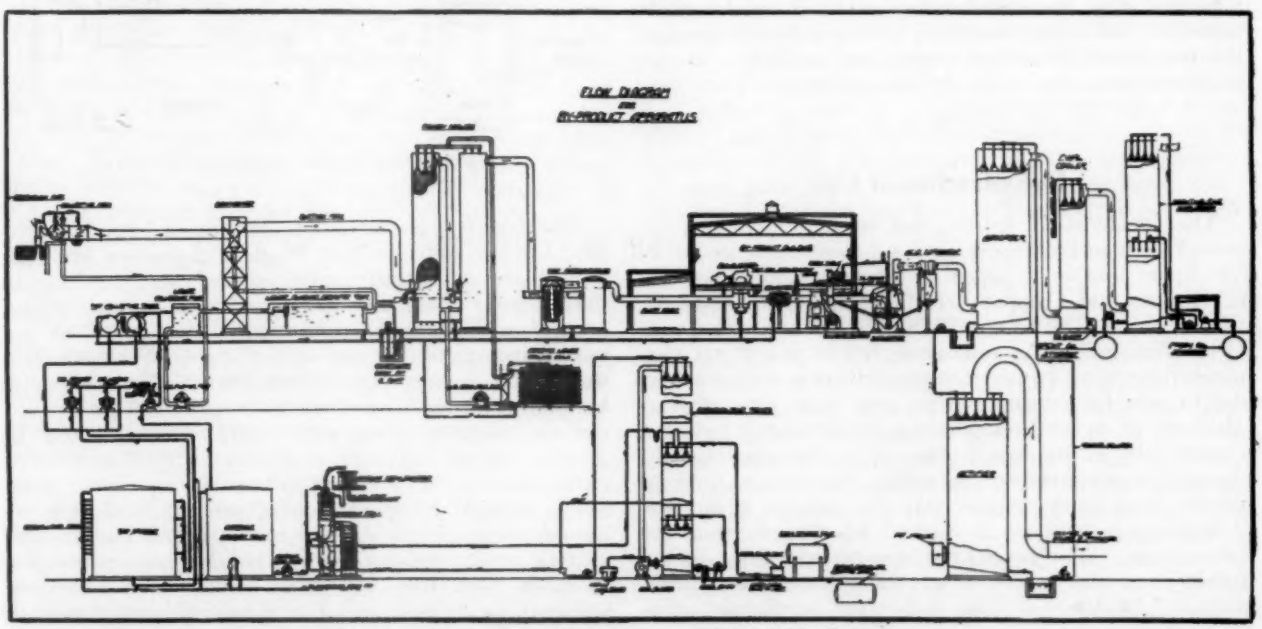
In addition to the above, there was secured from the water jacket of the generator about half the process steam required for the generator.

Further results were given by this same group on cyclonic dust catchers, Cottrell electric tar precipitation, and fuel charging. They also presented the following comment on reformed oil gas:

"There is now in operation at the Philadelphia Suburban-Counties Gas & Electric Company's plant at Chester, Pa., a reformed oil gas plant consisting of two U. G. I. mechanical generator water-gas sets, with necessary auxiliary equipment, for reforming refinery oil gas having a B.t.u. value of approximately 1700 B.t.u.'s per cu. ft. and a specific gravity of approximately 0.9 to a finished gas having a B.t.u. value of approximately 530 and a specific gravity of about 0.5. The reformed gas supplies a base load, and, due to its low specific gravity and general characteristics, can be readily mixed with either coal gas or carburetted water gas."

Chemical Engineering Influence

Supplementing the very brief reports of the chemical committee and its sub-committee on analysis and tests, there was presented at the convention by Professor Alfred H. White, of the University of Michigan, a discussion of the "Contributions of Chemical Engineering to the Gas Industry." Professor White brought out clearly the problems of film effect in heat transfer, condensation, cooling, etc. He showed how an understanding of fundamental physico-chemical relations had been of influence and could be still further utilized in coking, water-gas making, and various phases of gas-handling technique. Speaking of the more distant



Flow Diagram for By-Product Apparatus—Philadelphia Coke Company

future, Professor White outlined some of the problems of coal carbonization, including the importance of quick heat transfer to the coal, the methanation of gas, and the development of petroleum substitutes either from gas or coal. He also emphasized some of the ways in which the gas industry should develop an interlock with the petroleum, automotive-fuel, and power-plant business.

The use of propane and butane, which has previously been discussed by a special sub-committee of the water-gas group was fully reported on by a series of papers describing the results obtained at Davenport, Iowa; Louisville, Kentucky; Poughkeepsie, New York, Haverhill, Massachusetts; and, in less detail, other investigations. It is not necessary to review these matters here, as readers of the JOURNAL have already been rather fully advised by earlier articles as to the general principles involved. They should, however, read in considerable detail the three documents having a bearing on this subject, including the sub-committee report by P. E. Eddy, a very valuable article by J. F. Duesler, and an appendix by a sub-committee under the chairmanship of Ewald Hasse which formed a part of the Rate Structure Committee report.

It is of interest to note that Mr. Hasse's committee recognized the threat of competition in industrial and commercial gas sales offered by propane and butane. They urge that an appropriate rate structure be developed for commercial gas markets in order to meet this threat of competition from these important petroleum products.

Distribution of Gas

As in the case of the reports presented at the Production Conference, so also were the reports of the Distribution Committee duplicates of much of the splendid preliminary material submitted at the spring Distribution Conference. These reports included a discussion of meters, high-pressure distribution, pipe coatings and corrosion and unaccounted-for gas. As these subjects have already been reviewed in the JOURNAL in a general way, the consideration of detail should be obtained by interested members of the industry through the preprinted pamphlets which are available to all members from the A. G. A. headquarters.

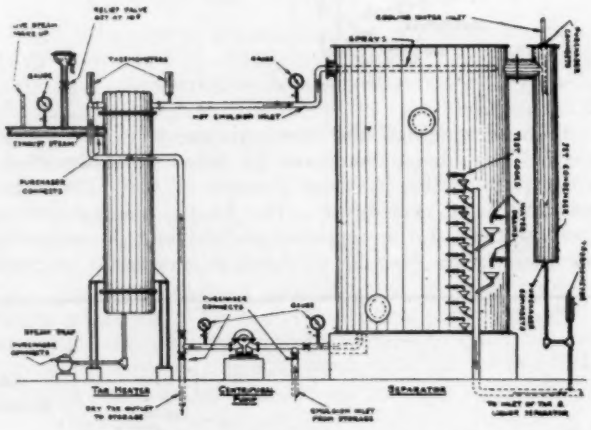
Dehydration of Gas

The problems of sending out of dry gas were discussed both in the report of a sub-committee under F. W. Sperr and in a paper by Charles Cooper, of W. C. Holmes and Company, Ltd., Huttersfield, England, who described the "Experiment of Gas Dehydration in Great Britain." The committee report points out that measurement of ground temperature is essential in order to plan for adequate but not excessive drying. Methods of ground-temperature measurement are discussed fully in the report where it is indicated how indicating thermometers, recording resistance thermometers, and other devices may be used to advantage. The dangers in indirect method of measurement are pointed out. The committee also reports fully on the results and the costs of gas dehydration at Grand Rapids, Michigan. The following tabulation summarizes these data in convenient form:

Daily Operating Costs, 5,000 M cu. ft. Gas Treated

	Winter Conditions	*Summer Conditions*
Power		
At 1.5 cents per H.P. hour liquor pump $4.48, oil pump $3.00	$ 7.48	$ 7.48
Steam		
At 50 cents per M lbs. for exhaust steam at 6 lbs. pressure	3.40	8.64
Labor		
Operator at 55 cents per hr., one-fourth one man's time each shift. 6 x 55 cents $3.30		
1 hr. shift foreman's time per 24 hr. 1.00	4.30	4.30
Make-up Liquor		
10 gal. at 8-1/3 cents per gal.	.83	.83
Cooling Water		
At 2 cents per M gals.	None	2.37
Maintenance		
Estimated at	3.00	3.00
Total Daily Operating Costs	$19.01	$26.62
Cost per M cu. ft. gas	.38	.53

Average Daily Cost = 46 cents per M. cu. ft.



Tar Dehydrator—Gas Machinery Co. Type

The results summarized from British experience by Mr. Cooper indicate that English engineers are convinced and enthusiastic advocates of the practice. In that country there are already at least sixteen plants, one of which has been in continuous operation for over three years; and the total daily send-out which is dehydrated is now over 50,000,000 ft. Mr. Cooper in his paper, which is available in preprinted form, points out the effective means which have been used and the general results obtained with respect to dust control, extension of meter life, improvement of governor operation, reduced corrosion, and depreciation charges required on the dehydration plant itself. All together the British results indicate very favorable conclusions and from the discussion there is no evident reason why the methods successfully used in England may not be readily adapted to American conditions.

Industrial Gas Section

Industry shows a healthy determination to increase its output to industrial prospects and users

THE nature of the various papers and committee reports presented before the Industrial Gas Section clearly indicates that the Industry is keenly alert to its possibilities and responsibilities in this direction. That is to say, it appreciates that its future output of gas in serving the country's manifold industries will by far overshadow the use of gas for other purposes. Moreover, the Industry realizes that such business will not be obtained merely for the wishing but rather by whole-hearted aggressive action.

In addition to this attribute of "fight" the meeting of the Industrial Gas Section demonstrated that its members appreciate the necessity for research and it is reasonable to assume that such research will be pushed energetically. If the Industry will but profit by the ideas and enthusiasm of this section its ideals will be most assuredly attained and Industrial Gas will be a fact rather than a mirage.

C. C. Krausse
Chairman-Elect, Industrial Gas Section

Some Pointers on Initiative

Philip Cabot, Professor of Public Management, Harvard University, showed beyond doubt that Industrial Gas business will only come through grasping the initiative and not waiting until some competitor has obtained a foothold in the particular field.

"The rule, therefore," said Mr. Cabot which should guide all great industries on the road to a permanent and honorable future is that they must seize and maintain the initiative through thick and thin and that their dominant and conscious purpose must be to make this world a better place for those who shall come after them. These are not counsels of perfection, but simple truths without which ultimate success is impossible in a world designed like the one in which we live."

Herewith are given some pithy observations from Mr. Cabot's meaty paper:

* * * * *

"Have you not, in fact, been opportunists driven by your more active and alert antagonists, first from one fortified position and then from another, always on the defensive and occasionally in the pitiful position of seeking the protection of the Government against your adversaries?"

* * * * *

"The best defense in a competitive field such as that in which your industry now operates, and has operated for many years, is a vigorous attack. You must keep your adversaries—coal, oil, and electricity—so busy defending their positions that they have no time to hatch schemes to attack you."

"Men are glad to follow a leader who has a plan of campaign, no matter how desperate the odds, but they will soon begin to desert from an army which has gone into camp for an indefinite period, no matter how comfortable the quarters or how ample the rations. An industrial organization which tries to stand still will soon begin to disintegrate."

* * * * *

"Raw coal must certainly be driven from the field and you must do it."

* * * * *

"I will suggest to you briefly two major considerations which are, I think, the foundation upon which any successful plan of campaign must rest. These are first, more skillful pricing of your service, and, second, more adequate development of the machinery of utilization."

* * * * *

"All this planning and scheming to build up your industry will be of no avail unless you can remove from your path a great obstacle which now obstructs it—namely, the high costs and in some cases, the poor quality of the appliances which your customers must have in order to utilize your service. This is one point at which the electric supply companies have a distinct advantage. Almost from the beginning the manufacture of electrical appliances has been in the hands of a few large and powerful producers, who by the magnitude of their operations were enabled to produce at low costs and to spend large sums in technical research and I have a lurking suspicion that the rapid expansion of the electric industry has been due more to the initiative of the manufacturers than to the genius of the managers of the electrical supply companies. Stimulation of this sort has been lacking in the gas industry."

An Aggressive Paper

In his paper, "Gas for the Industries—Holding What We Have," A. F. Mitchell, Northern Indiana Public Service Company, stated that "a high class fuel (gas) is being offered to industry and nothing less than the highest class of equipment should be considered." He then proceeded to outline the great flexibility of gas insofar as regulation is concerned and named a number of typical examples of the application of control to industrial processes and the economies obtained:

"You may not be aware of it, but it is a fact, that many of the furnaces now using gas are in danger of being lost to a more expensive method of heating and

all because of the lack of automatic control," said Mr. Mitchell.

Touching upon proper furnace design he said that "many gas loads have been lost due to improperly designed furnaces and also to the design, capacity or misapplication of burner equipment. With the information available today in this line of work these mistakes are inexcusable in many instances. Where this condition occurs, enough attention is not given to heating problems. Mistakes of this nature may be due to pure carelessness, inaccurate calculations, insufficient information, cheapening the cost to get the job, poor quality of materials, poor workmanship or many other causes that might be mentioned. Certainly many of these mistakes could have been prevented by using the proper precautions at the beginning."

Appliance Servicing Advised

He advised a careful servicing of industrial appliances to the end that such complaints as burner troubles, piping and valve leaks, effect of dusty atmosphere and the like would be reduced to a minimum.

Touching upon the matter of industrial rates he said that "the tendency is more to lean too much toward lower rates than it is to seek out appliances and methods to reduce the waste of gas. Rate reductions in some instances are right and proper when based upon the actual cost of manufacture and distribution plus a fair margin of profit. However, we should not depend too much upon lower rates. A continual harping upon this subject, to my mind, will justly turn many gas companies away from a field that by other methods might prove of interest to them and greatly help the cause."

"We should not hesitate to place the blame where it belongs when a gas load is in danger of being lost. If a gas company, by reducing its rates, can make a fair margin of profit, everything considered, that is certainly one way to make the load safe. If on the other hand equipment is at fault, the manufacturer should shoulder the blame and not make claims for his equipment that are beyond his ability to meet. Inferior equipment should not under any circumstances be sold in order to increase the manufacturer's or distributor's margin of profit. As far as industrial gas burning equipment is concerned, we should aim to sell the highest quality and best design possible, having in mind the greatest possible economy in gas as well as in the manufacturing processes."

Mr. Mitchell called attention to the need for a research bureau which would be concerned with Industrial Gas problems and equipment. In this connection he said:

"You may ask what sort of information or data would the bureau collect? My thought would be that data be first collected on all modern burners, mixers, standard furnaces, pyrometers and automatic controls. This could be followed by data on special furnaces and special equipment. Information available would include sizes, prices, manufacturers, gas consumptions, rate of production and cost per unit of product. Successful arguments and methods used to sell gas or hold the load would be available. The bureau would have a fund of information that would enable them to advise any gas company as to the best method of approaching a prospect on almost any manufacturing process where heat is used. Of course this is quite a sizeable job and the information available at such headquarters would naturally be limited for a time, but, if properly conducted there is no reason, that I can see, why the fund of data would not gradually increase, making the bureau more and more valuable to the gas industry with every added year.

"The personnel of this bureau should consist of say four men of wide experience in industrial gas sales work. This is certainly a small complement of men, if we wish to accomplish anything worth while. These men should not be selected from the personnel of any concern manufacturing industrial gas equipment, but rather from departments of gas companies now showing material increases from year to year in the sale of gas for industrial purposes. These men should be unattached by any manufacturer of gas equipment. They should be free to recommend any appliance that will be a help in the sale of gas regardless of who the manufacturer may be. This is important because many manufacturers of furnaces and equipment, today, are not receiving the cooperation they should from gas companies, and the gas companies are not making the progress they should due to this lack of cooperation. I am quite sure that this is a factor in gas sales worthy of careful consideration."

Linked very intimately with the suggestion of Mr. Mitchell for a research bureau was the paper, "The Aeration of Gas Burners," by O. L. Kowalke and N. H. Ceaglske of the University of Wisconsin. This paper went very thoroughly into a study of the characteristics of a particular type of laboratory burner as regards the entrainment of air by injector action and the like. Of a highly technical nature it would seem to emphasize the need for a more protracted study and research of a great variety of burners. Hence, it is felt that here is a definite problem that could be handled by a research bureau.

To those who are interested in a theoretical discussion of burner design a study of this paper is recommended.

Industrial Rate Schedules

"In any discussion of off-peak schedules," said E. L. Wilder. Rochester Gas & Electric Corporation, in his paper, "Off-Peak Rate Schedules for Gas," "there are, two corresponding classes of off-peak load which must be considered. One load is that which will fill up the valley in the send-out curve which occurs each day, usually at night, and which will tend to make use of the distribution system capacity which otherwise will be idle. The other load is that which tends to fill up the seasonal valleys in the send-out curve and to make use of generating capacity which otherwise would be idle. As an illustration of the first kind, note the daily send-out curves shown in Fig. 1. A study of a large number of such send-out curves on one particular system shows that although the form of the send-out during the day varies—a single high peak in the morning on Sundays and holidays and two peaks, morning and evening, on other days—the send-out is always low during the night hours from about 8 P. M. to 6 A. M. Any load which is on during these hours and which is not on during the day hours, will require, in general, little if any additional investment in distribution system. An example of an off-peak rate schedule actually in force, designed to take care of such a load, is as follows:

"Availability: Commercial and industrial service where greatest demand occurs between 8 P. M. and

6 A. M. and where gas is used exclusively for all heating purposes with a normal monthly consumption in excess of 100,000 cu. ft. Consumption charge, 90 cents per thousand." A service charge varying from $3 to $30.50, according to the size of the meter, is added to

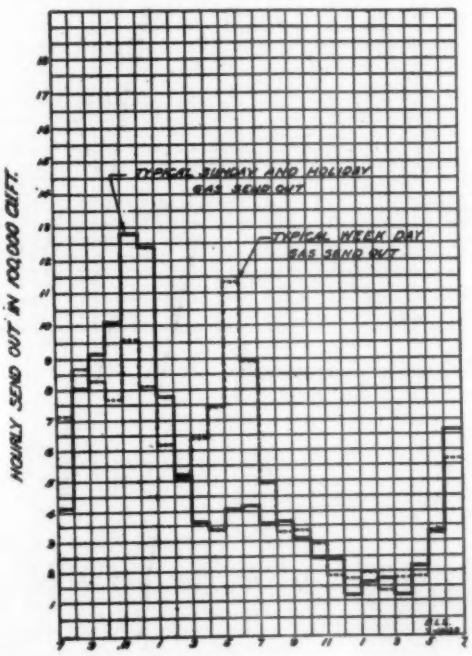


Figure 1

the consumption charge; the minimum bill being equal to the service charge.

Distribution capacity has a seasonal aspect as well as a daily aspect. On systems where a considerable proportion of the load is domestic cooking, the short hour demand on the distribution system is very high on Sundays and holidays as compared with other days. This does not mean that the 24-hr. load or the production demand is high on these days. As a matter of fact, the 24-hr. maximum demand is not liable to occur on the same day as the hourly maximum demand.

In Fig. 2 are shown curves which will illustrate what I mean. Curve "A" gives the maximum hourly gas peak occurring on Sundays and holidays. This always occurs on or about the noon hour. On days other than Sundays and holidays, there are two peaks—one in the morning and one in late afternoon, or early evening. Curves "B" and "C" show the maximum morning and evening peaks respectively on days other than holidays and Sundays. In this particular system evidently the gas distribution system must be designed to take care of Sunday and holiday peaks and any load not on during Sundays and holidays is, at least to some extent, off-peak. One rate which is designed to take advantage of this fact reads as follows:

"The rate under this contract is available only to a gas customer whose demand between the hours of 10 A. M. and 2 P. M. on Thanksgiving Day, Christmas Day, New Year's Day, and Sundays during the period from November 15th to the following March 15th, does not exceed 10% of his maximum demand as defined herein.

"If any customer, after contracting for this rate, shall at any time use gas in the hours specified above in excess of 10% of the maximum demand recorded, then the customer shall no longer be entitled to this rate." There follows the rate itself which consists of a Demand Charge and a Consumption Charge.

"We now come to a consideration of the production demand. This demand is based upon 24-hr. send-out since plant capacity must be based upon this send-out, the shorter period fluctuations being taken care of by holder capacity. In Fig. 3 is shown the 1928 send-out curve of one company, together with a curve showing outside temperatures. It will be seen that except for a small valley during June, July and August, a very even send-out is indicated. There is, however, during these summer months quite a little generating capacity which is not needed and which might well be put to use. As this company is actively pushing the gas house heating business, the picture within a few years may be quite a different one.

"In Fig. 4, curve 'A' is the same send-out curve plotted for simplicity sake on a monthly basis. Curve 'B' is the load that will be produced by 1000 heating customers of average size. This is the number of heating customers which it is expected will be added in a comparatively short time. Curve 'C' is the sum of

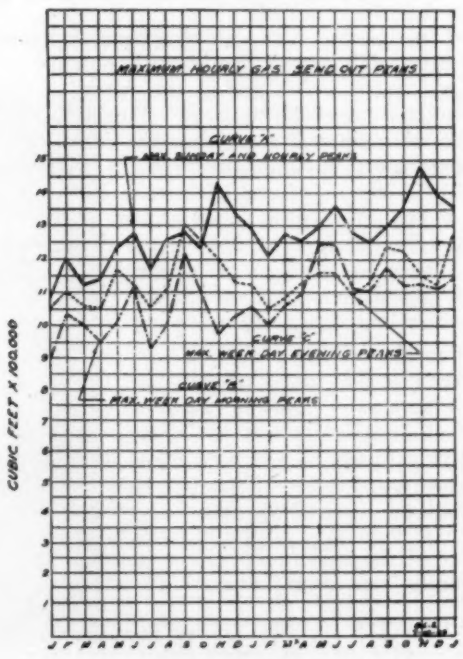


Figure 2

these two send-outs and shows what the total send-out would be if this heating load were added to the present send-out. Our little summer valley has now become quite a serious factor in the yearly load factor and it is on this account that it seems eminently worth while to bend every effort toward developing an off-peak summer business. This is especially true when we consider the rapidity with which gas house heating is developing.

"Lest I may create a false impression, I wish to state that the whole matter of adjusting rates to take care of the conditions outlined above, is a very complicated one and requires careful analysis of the conditions controlling distribution and operation in each particular system. For example, it is possible that a load which is on only during the night hours may require some dis-

tribution investment because of its location in respect to the already existing distribution system. The Sunday and holiday peaks probably will not affect the whole distribution system equally and may have little effect on a part of the system where industrial load predominates. That there is, however, a justification for offering special inducement rates to such businesses as do not put their full demand on the generating or distributing systems, can hardly be questioned.

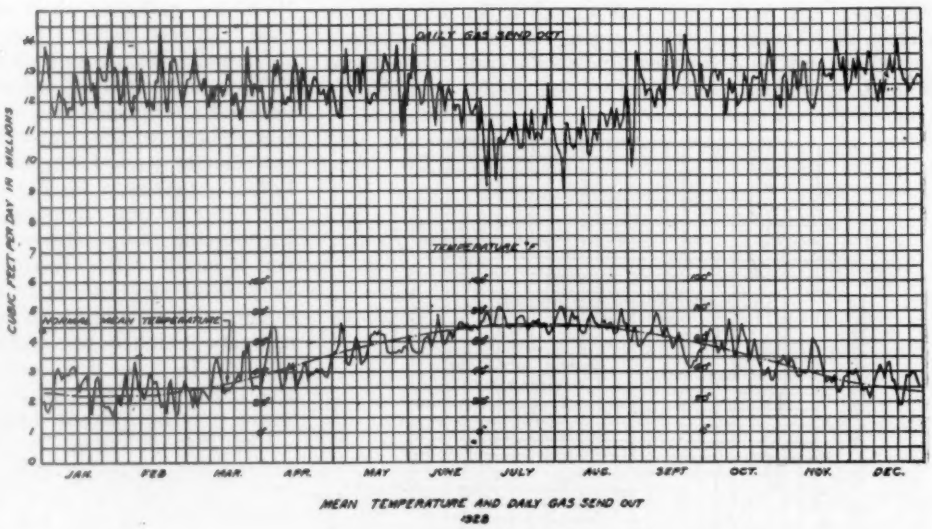

DAILY GAS SEND OUT
TEMPERATURE °F
NORMAL MEAN TEMPERATURE
CUBIC FEET PER DAY IN MILLIONS
JAN. FEB MAR. APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
MEAN TEMPERATURE AND DAILY GAS SEND OUT
1928

Figure 3

"A review of the gas rates in force as given in the 1929 Rate List shows that very little has been done in the way of promoting off-peak business by means of special rates. There is a considerable number of industrial gas rates which are in the form of a demand charge plus a commodity charge. This is a step in the right direction since it recognizes the fact that there is a demand cost as distinguished from a commodity cost and with a demand form of rate it is comparatively simple to put an off-peak schedule into effect. It is not necessary, however, to wait to get a demand form of rate in order to establish an off-peak schedule. One form of rate, for example, which is designed to encourage summer load takes the following form:

"During the winter period, November 1st to March 31st inclusive, the customer will pay for all gas used at the winter rate. During the summer period, April 1st to October 31st inclusive, the customer will pay at the winter rate for all gas used up to an amount equal to the maximum consumption per month taken during any month of the winter period, November 1st to March 31st inclusive. For the remaining consumption in excess of the maximum winter month consumption, the summer rate per thousand cu. ft. will apply in place of the corresponding unit charges per thousand in the winter schedule:

	Winter Rate per M cu.ft.	*Summer Rate per M. Cu. ft. Apr. 1—May 31 Sept. 1–Oct. 31*	*June 1–Aug. 31*
For the first 20,000 cu. ft. per mo.	$1.00 net	$.50 net	$.35 net
For the next 30,000 cu. ft. per mo.	.95 net	.50 net	.35 net
For the next 50,000 cu. ft. per mo.	.85 net	.50 net	.35 net
For the next 100,000 cu. ft. per mo.	.75 net	.50 net	.35 net
For the next 300,000 cu. ft. per mo.	.65 net	.50 net	.35 net
For the next 500,000 cu. ft. per mo.	.60 net	.50 net	.35 net
Excess over 1,000,000 cu.ft. per mo.	.55 net	.50 net	.35 net

Forging Furnace Investigation

Walter E. Jominy, American Gas Association Research Investigator, University of Michigan, in his paper, "The Influence of the Constitutional Characteristics of Steel on the Design of Forging Furnaces," outlined the research carried on in order to show the superior product turned out by the gas-fired furnace as compared furnaces fired by other other fuels. He said:

"In carrying on the research at the University of Michigan, an attempt was first made to consider the fundamental differences between the results obtained when using gas and those obtained when using oil as a fuel. If a furnace were well insulated and

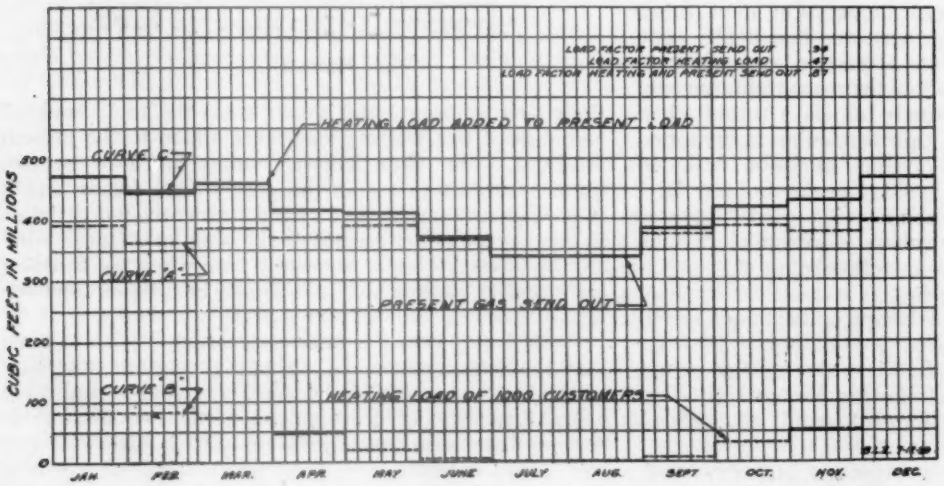

LOAD FACTOR PRESENT SEND OUT 98
LOAD FACTOR HEATING LOAD 47
LOAD FACTOR HEATING AND PRESENT SEND OUT 87
HEATING LOAD ADDED TO PRESENT LOAD
CURVE C
CURVE A
PRESENT GAS SEND OUT
CURVE B
HEATING LOAD OF 1000 CUSTOMERS
CUBIC FEET IN MILLIONS
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.

Figure 4

designed and fired with gas, what advantages would it have over a furnace equally well insulated and designed and fired with oil? Fundamentally, there are two main points of difference: First, it is possible in a gas-fired furnace to obtain a uniform atmosphere and to control this atmosphere; and, second, since the burners can be placed almost anywhere along the heating chamber, it is possible in a gas furnace to obtain great uniformity of temperature. There is a third point which is possibly of lesser importance than the two just given, but which might well be mentioned. Oil being a liquid throws a longer flame than does gas and therefore, if flame is to be avoided in the heating chamber, a larger space for combustion must be provided.

"One objective of this research, then, was to determine whether any of these fundamental points of difference were advantages such as would favor gas for a fuel in the heating of steel for forging. Another objective was to determine just what rates of heating, and what temperatures and atmospheres are most desirable in a forging furnace in order to assure proper heating.

"The facts so far obtained appear to favor the gas furnace. This does not mean, however, that there is no need for further experimental work. Much remains to be done, if gas is to be successfully used in forging furnaces."

Various tests were conducted showing what happened to a sample of steel while being heated up. Herewith are two curves showing certain characteristics of samples of steel during heating up periods.

Mr. Jominy placed particular stress upon the need for automatic control.

Natural Gas Section

Problems of mutual interest to Natural and Manufactured Gas Divisions receive consideration

IT is felt that more and more the Fall meeting of the A.G.A. will include matters pertaining to the Natural Gas business. This condition is demanded for two reasons; first, due to the fact that two associations are now one and, second, because the Manufactured Gas man should know a lot about Natural Gas. Natural Gas is being introduced very rapidly into Manufactured Gas territory and the need for schooling in Natural Gas technology is obvious.

There is much in common between the two branches of the Industry and, from the standpoint of transmission lines at least, the Natural Gas man has taught his Manufactured Gas brother a great deal of immediate value.

Henry C. Morris,
Chairman-Elect, Natural Gas Section

Pipe Line Methods

In his paper, "Modern Pipe Line Construction Methods," Elmer F. Schmidt, Lone Star Gas Company, Dallas, outlined the most recent methods for running gas pipe lines. One interesting feature brought out was the use of the airplane for making a preliminary survey of the proposed route for the pipe line. In this connection he said:

"Many new factors enter into the building of large lines beginning with the preliminary survey to the final testing of the finished line. The most modern means of transportation, the airplane, and highly developed telescopic photography has been brought into modern pipe line construction. In some of the rugged sections of the country it has been found practical and essential to make aerial surveys of the proposed route. By this means a reduction of the time required for the preliminary survey is accomplished and an opportunity is afforded for the selection of the most advantageous route. An aerial survey to include a strip four miles wide along the proposed location can quickly be made and will disclose most of the obstacles that would confront the construction work. With such a survey at hand it is possible at once to stake the best right of way particularly in rough and mountainous country. The airplane is also used by some contractors for inspection of the proposed route making it necessary for more close inspection only where rock may be encountered or unusual construction difficulties exist."

He also emphasized the need for a physical examination of the men employed on the work saying:

"Another factor that is contributing to lower pipe line construction costs is the physical examination of all men employed in such work. On one of the construction jobs which we now have under way we have required that each man pass a physical examination conducted by a competent physician. The physician is employed by us and is stationed on the job. Out of a total of 752 men examined for one crew, a total of 179 were rejected. Principal causes of rejection were as follows:

Potential hernia, hernia, hemorrhoids, varicocele, poor vision, high blood pressure, heart trouble and general physical condition.

This has given us not only a more physically fit construction crew but has resulted in increased efficiency, and also shows a potential saving on this job of approxi-

mately $18,600 (based on the Hartford Accident and Indemnity Company's experience of approximately $600 per case) on hernia cases alone. It is quite impossible to estimate the potential saving from the other rejections, but there is no doubt but that it would run into many thousands of dollars."

Storing Gas Underground

S. W. Meals, Carnegie Natural Gas Company, Pittsburgh, spoke of the feasibility of storing Manufactured Gas underground in his interesting paper, "The Underground Storage of Gas." He related what the Natural Gas men are doing in this regard and predicted that many Manufactured Gas companies would eventually store gas underground. His paper follows in part.

"For the Manufactured Gas companies to operate and supply their consumers and meet the maximum demands, it is necessary that they have adequate holder capacity. It is estimated that over 5% of the entire investment in the Manufactured Gas Industry is in gas holders. There are about twelve thousand in the United States and the United States Bureau of Census figures show that on December 31, 1927, the rated capacity of gas storage holders used by the Manufactured Gas Industry was 1,225,930 M Cubic Feet. Since that date, however, a large number of from five to twenty million foot holders of the waterless type have been built. Last December the Peoples Gas Light and Coke Company of Chicago inauguratd a twenty million foot holder to better handle the increasing demands on their system in the Chicago district. Increased holder capacity will doubtless be needed in many places.

"The Natural Gas Industry requires very few above-ground gas holders as the sands from which the wells produce are a natural reservoir or storage. Since 1927 in sections of Oklahoma, Texas and California, large volumes of gas have been stored in gas and oil bearing sands as a conservation measure. The tail gas from gasoline plants has been injected and this practice in a number of localities has proven very successful not only in conserving gas but in increasing the production of oil. Injecting natural gas in partly depleted sands for storage purposes has not been carried on to any great extent although a few of the larger companies in the East have, for a number of years, used this practice as an operating convenience. The relatively large industrial load enjoyed by many natural gas companies has leveled the total load curve and has limited the need for above-ground storage.

"The largest gas storage field of which we have knowledge is located in Central Kentucky. The formation in which the gas has been stored is found at a depth of less than one thousand feet and covers an area of about twenty-seven square miles, with about eighty wells. The gas is metered as it is injected into the sand. It requires 218,000 M cubic feet to raise the rock pressure one pound and if this amount is withdrawn, it reduces the rock pressure one pound. About eight billion cubic feet of natural gas has been stored in a natural storage reservoir. This one storage field with a pressure of seventy pounds holds more than six times the total of all the manufactured gas holder capacity in the United States.

"The Zoar storage field thirty miles south of Buffalo, New York, is a valuable asset to the Company supplying gas to Buffalo. There are twenty-three wells in the field and with 50 lb. differential over line pressure, ten million cubic feet per day can be taken out to meet their peak demands.

"In the September 20 issue of 'The Oil Weekly,' Warren Baker, Staff Representative, gives a detailed report of Continental Oil Company's experience in re-pressuring their South Ponca field in Oklahoma. He states many of the wells were filled in 1912 and 1913. In 1925 wells were being plugged rapidly in this area due to the depletion of the gas, therefore, the total oil production of the property had decreased to forty-two barrels per day. Recently the Company began re-pressuring this property and are now recovering six hundred fifty barrels per day. Some of the wells which were formerly pumping now flow their production. The Company is using seven key wells, pumping the dry gas from its gasoline plant into those key wells. Back pressure is held on the wells in order that only the gas necessary to flow the oil is liberated.

"One Company, operating in West Virginia and Ohio, has had an Engineering firm make a proper study of its oil properties and at this time has a number of properties under pressure. The result is an increase of from 500% to 600% in the oil production."

* * * *

"With these facts in mind, I wish to present to our Industry a new idea which I believe will not only prove a panacea for many Manufactured Gas operations, but a great help in the future to the Natural Gas and Oil Industry and a blessing to man as a conservation measure. Manufactured Gas can be properly cleaned and stored in depleted or partly depleted oil and gas bearing formations in the earth, recovered when needed and due to the hydrocarbons still remaining in the sands, the gas recovered will be considerably heavier and richer. The lean gas, having affinity for the richer hydrocarbons, will recover and remove from the sands valuable fuel that otherwise would be entirely lost.

Experiments in Storing Gas

"One of the operating companies in the Pittsburgh district, secured all the wells and royalty interests in a gas field, proceeded to experiment in cleaning and storing manufactured gas in one of the deep white sand formations. The entire production from this field, before manufactured gas was injected, was close to five hundred thousand cubic feet per day under a vacuum. Thirty-three million cubic feet of about 580 B.T.U. gas was injected into a few wells, later over thirty-seven million cubic feet was withdrawn. About twenty billion B.T.U's. were injected, thirty-two billion recovered or an excess equivalent to twelve million cubic feet of Natural Gas. The formation in which this gas was stored was found at a depth of about three thousand feet; close to ten feet of the sand was pay or open sand. The porosity of the sand was over 20%. The pressure required to force the gas into the sand varied from thirty to seventy pounds. This variation was due to friction in the tubing. The temperature in the sand was 85 degrees Fahrenheit and at all times the flowing gas injected was cooled below this figure. I am of the opinion that depleted oil sands will prove even a better storage than the gas sands, provided the sands are free from water.

"I believe plenty of these natural storage fields can be found in any of the States where Gas and Oil has been produced and depleted or partly depleted. Of course, it will require a complete study of each particular field, and there are a number of difficult problems to overcome However, with proper cooperation of the operating companies, these problems can be solved and the value of such a storage to a large Gas Utility will well justify the effort.

This will be particularly true when large househeating loads are on the lines."

* * * *

"For the Manufactured Gas Industry to take the benefit of the earth's natural storage reservoirs, it may require the gas to be manufactured at the mine and pumped to the large cities as the Oil and Gas fields are usually in the same area in which the coal fields are being operated.

"It may even be economical for manufactured gas companies under present conditions to send their gas to relatively distant underground storage and then to return it as needed. It will be necessary to compare investments and operating costs for each situation before it can be determined whether above-ground or underground storage is more economical. My point is that the possible use of underground storage should be investigated.

"While it may seem that some of our present operating oil and gas territory will never be used for the storage of gas, it is wrong and an injustice to posterity to flood oil territory with water to increase production where other methods could be used or to improperly plug abandoned wells or to otherwise damage these underground storage spaces which may be so valuable in the future.

"Some natural gas companies are now putting gas underground for storage. All natural gas companies depend to a greater or less extent on the capacity of the producing fields for storage. Many natural gas and manufactured gas companies will use underground storage in the future. The practice has been proved to be thoroughly practicable under proper conditions. I commend future attention to and study of this subject."

Commercial Section

Important problems on domestic consumption and sales methods discussed

THE problems confronting the Gas Industry along the line of furthering the operation of the Commercial Department and increasing gas consumption in the home are not only difficult of solution but are becoming increasingly more numerous and diverse. This is obviously due to America's ever-changing trends in living conditions.

To cope with such matters involves an exact familiarity with the surrounding conditions. Further, it demands a smooth-running organization to carry on. In considering one example, house heating, it is patent that the Commercial Department must acquaint itself with many phases, such as, insulation, piping, conversion burners and many others.

The sessions of the Commercial Section demonstrated that all of the problems at hand are well on the road to a satisfying and profitable solution.

Geo. E. Whitwell,
Chairman-Elect, Commercial Section

The Relation of Insulation to House Heating Sales

In defining the term, "insulation," Paul D. Close, Technical Secretary, American Society of Heating & Ventilating Engineers, in his paper, "The Importance of Insulation in the Future Development of the House Heating Market for Gas," said,

"In the more practical sense and in the sense implied in this discussion, a heat insulation is a material or substance which will retard, and to a degree (but not entirely) stop the passage of heat from the warmer to the cooler level, that is, it is a material which has a high resistance to the passage of heat.

"When installed in a wall, an insulation retards the passage of heat through the wall. In other words, a smaller amount of heat will pass through the wall in a given period of time, say one hour, than if it were not insulated, and consequently less heat and less radiation is required to maintain the desired temperature in the building. Furthermore, the building will be cooler in the summer."

Mr. Close brought out that insulation is not a new idea, saying:

"The insulation idea is a comparatively new one from the commercial standpoint. The principle of insulation, however, has been in use since the beginning of creation, and is a fundamental of nature. For example, fur is one of the best insulations known and hence it can be said that fur-covered animals are insulated. If it were not for this marvelous insulation, the polar bear could not withstand the cold blasts of the polar regions and sleep on icy floes and bathe in icy waters. Feathers provide a degree of insulation and therefore birds are insulated. It is even possible that there are insulated fish. Why do people wear clothing? Aside from purposes of modesty, the insulation idea is the main reason for wearing clothing. During the hot weather, we sometimes wish we were not so well insulated. In fact, in some cases we "uninsulate."

Even the use of insulation for dwellings is really not new. The thatched hut of northern Europe was insulated because it was built with walls of clay and stone several feet thick and a roof of straw two feet thick woven together. The stone castles of the middle ages had walls of sufficient thickness in many cases to justify their being called insulated. They had layers of rushes on the floor ten inches thick to keep our ancestors' toes

from being frostbitten. This was floor insulation. The Spanish Mission houses of the southwest desert, where the temperature often rises to 140 deg. in the daytime, were always marvelously cool because the walls were built with three feet of clay and straw. They were well insulated, although little or nothing was known of the principles of insulation. These buildings were well insulated, primarily because of the thickness of materials used rather than the kind.

"It is possible," said Mr. Close, "to reduce the heat losses of a building one-half to two-thirds by the use of storm windows, good weatherstripping and a sufficient thickness of insulation. In fact, in extreme cases the heat losses can be reduced to an even greater extent. This is especially true with a poorly constructed building where the average heat losses for a building of the size and type involved are greatly exceeded."

Touching upon the economics of the question he said that "in many cases the saving in radiation will permit the use of a smaller size boiler, and this saving should of course be credited to the insulation. If a hot water system is installed, the saving in radiation will be even greater than in the foregoing analysis. Under certain conditions the saving in radiation and the use of a smaller capacity boiler will pay for the insulation. In fact, in some cases the saving in radiation may alone be sufficient to pay for the insulation.

"Where warm air systems are used the reduction in the size of the physical equipment is not usually an appreciable item, especially where conversion burners are used. The value of the insulation is reflected primarily in the fuel saving."

In concluding he brought out that "The importance of insulation in the use of gas as a fuel for house heating cannot be over-emphasized, for without adequate insulation, buildings cannot usually be economically heated. If insulation, weatherstripping and storm windows are used, heating costs with gas can sometimes be reduced to the level of coal or oil for uninsulated buildings. If gas is to be used as a fuel, the installation of a substantial thickness of insulation is justified from the economic point of view. Moreover, the cost of the insulation is offset in a measure by the reduction in the size of the heating system. In exceptional cases, this saving may even be sufficient entirely to pay for the insulation."

Cooperative Merchandising

A. J. Peter, Consolidated Gas Company of New York, touched upon a very important phase of Commercial Department activity in his paper, "Results from Cooperative Merchandise Activities and Suggestions for Further Improvement." In part he said:

"Now as to results. I suppose it's entirely true to state that there isn't a company in the entire membership of the American Gas Association that is not doing something, in one way or another, for the trades and dealers. They get a certain amount of business from them with little or no effort and no special records are kept of these transactions except as they are needed for the usual conducting of our businesses. For this reason as well as the fact that a certain amount of the work that our Trades Relations Departments are engaged in produces more or less intangible returns, comparisons are quite difficult. We did a certain amount of business with these agencies before the formation of our Trades Relations Bureau—never satisfactory it is true—but, nevertheless, it was there. However, during the first eight months of this year we gave to the plumbers, steamfitters and other cooperating trades $95,616 in the form of discounts, allowances and commissions for the sale of appliances. This is quite a sizeable amount even for a territory as large as that served by our companies and it represents considerable effort on the part of the 93 plumbers, steamfitters and heating and piping contractors who are displaying our appliances. These 93 outlets were selected because of the location and attractiveness of the stores and shops and for the prominence of the men in their particular line of work. There is no doubt in my mind that you all agree that there is a tremendous psychological effect on prospects who see our appliances displayed in establishments of this kind and no attempt can be made to evaluate the worth of this space to us. We are satisfied that our results are quite in keeping with the time and money spent.

Race for the Dollar Goes On

"Any attempt to present suggestions for the further development of our Cooperative Merchandise activities should start with a recounting of the economic factors that make it apparent why it is advisable for the gas industry to be actively engaged in this work. But because of my time limit today and because this ground has been so thoroughly covered in many papers and articles in the past year, I am not going to repeat them here. We all know that in spite of the tremendous increase in the purchasing ability of the public that the spirited race for a share of the consumer's dollar goes on apace and that the more serious competition is the indirect one produced by the newer industries such as the radio, automobiles, moving pictures and amusements. We cannot hope to retain our rightful place in the industrial structure of the country unless we secure the proper outlets and representations before their services are utilized by these other industries and attractions.

"We must establish friendly and cordial relations with agencies that are influences in the community and we must make it worth their while. Attractive discounts, allowances and commissions must be provided for the cooperating trades and dealers.

"Provisions must be made to properly educate these forces so that gas service in all that term implies will be sold and stay sold. Tactful, diplomatic representatives must be selected to form the contracts between our companies and the trades and dealers because within any cooperating group there is bound to be considerable difference of opinion.

"Engineering as well as sales assistance must be provided for our sales allies and above all their shop windows and stores should receive our unstinted attention to see that the displays are as attractively presented as are our own.

"Appliance manufacturers should be encouraged to work with and assist us in our efforts with the trades and dealers. The manufacturers' advertising should be as unselfish and helpful for the plumber and steamfitter as is the plumbing fixture manufacturers, the insulating material manufacturers and the heating equipment concerns.

"The salesman, engineer, display man, advertising man and service man should all cooperate and coordinate their efforts to secure the good will of these invaluable allies.

"All of our own advertising should be careful to state that approved appliances can be purchased through the trades. Advertisements in the plumbing and heating and piping contractors' trade journals should emphasize the attractiveness and advisability of cooperating with the gas industry.

"Plumbers' prospects should be circularized with our direct mail advertisements but this should bear the plumbers' imprint. Our cooperating agencies should receive through us regularly the journals and publications that are published to stimulate merchandising efforts. In short, everything should be done to convince the plumber, steamfitter and dealer that he is really an ally."

Salesman's Compensation

A very important feature of the Commercial Department's work is concerned with the rate of pay enjoyed by the salesmen. The "Report of the Committee on Fundamental Principles of Salesman's Compensation," F. L. Hallock, Chairman, stated that the salesman is expected to "take care of a very diversified complex sales transaction because of the dual nature of this transaction.

"He is the company in a given case and must have the ability to represent management in his service contacts. He is also a merchandise salesman and should have all the qualities that any merchandise salesman must have to sell successfully. He must not only sell the merchandise in question but must also sell the customer on using his service which will mean a monthly expense through the period of the life of the appliance.

"These dual duties require that he be a man of some vision, the possessor of a genuine enthusiasm, recognizing that he must bear his share of responsibility in molding public opinion in so far as the attitude of the public toward his company and its service is concerned."

In discussing the functions of the salesman and their relation to his rate of pay Mr. Hallock said:

"First Function—Service Work

The suggested method of compensation for the first function is 'salary.' He may be required to do work other than selling as emergency requires or policy demands, and the salesman is better satisfied if he is compensated for service work done by him which is not paid for by commissions or bonuses on the actual sale of appliances.

"Unmetered service is a term which is most fitting as a further explanation of what the first function is to cover. It provides the salesman with more freedom and creates a better atmosphere and some other interest is apparent beside the desire to sell appliances only.

"Second Function—Selling Appliances

In merchandising activities, it is usually known what percentage of gross sales amount a sales department can pay out in straight merchandise selling expense and naturally, it will try to avoid exceeding the limit that is set. This percentage can be paid out as commission on merchandise sales amounts and furnishes the salesman with a direct incentive because as his merchandise sales increase, his earnings increase, he investing his energy against the company's capital.

"Third Function—Selling Gas

As a representative of a public service organization, the salesman should influence the increased use of its principal commodity, which is gas. Generally, those appliances which meet with the most sales resistance are the best load builders. Therefore, if the salesman is to increase the sale of those uses of gas which are most profitable to the company, inducement should be offered which will encourage and stimulate the sale of what are commonly known as 'load building appliances.' This inducement can be in the form of a load building bonus, recognizing the additional sale of gas and its load relations."

He gave the following table of earnings of salesmen in other lines of work and brought out that "the gas industry is in competition with every other industry for the highest type of sales ability."

Lines of Business	*Net Average Earnings Annually*
Kitchen cabinets	$3,000
Lighting fixtures—manufacturers	6,000
Machines and small tools	5,000
Motor trucks	4,800
Office appliances	3,900
Office supplies	4,000
Oil burners	3,750
Plumbing supplies	4,000
Printing and lithographing	5,000
Radio—wholesale	3,500
Real estate	7,500
Refrigerators	5,000
Sheet metal products	5,000
Toys (wholesale)	7,000
Washing machines	4,200
Adding machines	4,800
Automobiles—retail	4,800
Building specialties	3,080
Clothing—manufacturers, wholesalers	6,000
Cooking utensils	3,500
Electrical appliances	4,550
Insurance, automobile	7,600
Electrical commercial refrigerator	6,900
Filing equipment	4,350
Bakery machinery	6,000

"Average yearly salary of various business as represented in above list is approximately $4,930 per year."

Report of Architects' and Builders' Service Committee

R. A. Koehler, Chairman, Architects' and Builders' Service Committee, showed the trend of building by way of the following tabulation:

THE RECORD OF 1928 BUILDING CONTRACTS AWARDED FROM DODGE BUILDING REPORTS AND BUILDING DEVELOPER

	Population	*Dwellings*	*2-Family Dwellings*	*Apartments*
Maine	768,014	315	6	30
New Hampshire	443,083	164	20	23
Vermont	352,428	148		6
Massachusetts	3,852,356	6,593	2,704	941
Rhode Island	604,397	1,627	63	51
Connecticut	1,380,631	3,181	362	312
New York	10,385,227	7,135	2,670	4,493
New Jersey	3,155,900	3,513	1,036	1,775
Pennsylvania	8,720,017	4,530	962	810
Maryland	1,449,661	1,234	19	93
Delaware	223,003	93	1	16
Dist. of Columbia	437,571	479	31	182
Virginia	2,309,187	1,596	23	144
West Virginia	1,463,701	281	23	70
Ohio	5,759,394	10,318	668	781
Kentucky	2,416,630	389	63	83
Illinois	6,485,280	6,789	1,556	3,518
Indiana	2,939,390	3,405	182	198
Iowa	2,404,021	959	41	39

Wisconsin	2,632,067	4,127	868	456
Michigan	3,668,412	8,928	2,171	670
Missouri	3,404,055	3,718	828	945
Kansas	1,769,257	1,965	138	100
Oklahoma	2,028,283	1,831	550	165
Nebraska	1,296,372	1,244	16	48
Minnesota	2,387,125	2,205	179	111
North Dakota	646,872	120	3	12
South Dakota	636,547	164	4	10
North Carolina	2,559,123	1,877	80	181
South Carolina	1,683,724	425	6	11
Georgia	2,895,832	2,335	208	245
Florida	968,470	2,138	146	191
Tennessee	2,337,885	1,325	119	177
Alabama	2,348,174	1,441	19	202
Mississippi	1,790,618	829	22	35
Arkansas	1,752,204	992	24	59
Louisiana	1,798,509	1,702	942	103
Texas	4,663,228	7,635	962	440
Total	96,807,648	97,751	17,550	17,786

Relative to the above the report went on to say:

"Just what effect this change from the single-family house to the apartment dwelling will eventually have on the sales of gas for domestic purposes can best be answered by each gas company.

"However, all authorities agree that this change in character of the American home life will seriously affect the living conditions as well as the social and economic life of the apartment dwellers, and the sale of gas to this type of customer will lessen unless adequate measures are now taken to obtain and retain this class of business.

"Your Committee respectfully recommends that the following suggestions be given serious consideration by every gas company executive.

"1. That special architectural and building promotional sales activities be employed to tell and sell the story of gas to all architects, builders, heating engineers, and plumbers. We believe that this missionary work among architects, builders, etc., is one of the biggest promotional sales activities that any gas company has to do, and that special architects' and builders' representatives be employed wherever possible to sell the idea of gas.

"In industrial and commercial buildings, the proper size piping is necessary to insure sufficient gas supply for the future tenants' needs.

"In apartment buildings, it is necessary to have the proper size and arrangement of piping to provide for space heating, large volume water heating (where the gas company makes a rate that enables it to sell large volume water heating), cooking, refrigeration, and laundry equipment.

"To also sell the idea for 1 and 2-family houses that the proper size and adequate gas piping take care of fuel requirements, for central heating plant, space heaters, incinerators, water heaters and laundry equipment as well as cooking.

"To sell the idea that it is necessary in stores to provide gas piping for heating and water heating, cooking and incineration.

"In lofts, manufacturing plants, commercial garages with repair shops, newspaper publishing plants and others where the industrial load might be built up.

"In hospitals, institutions, churches, museums, etc., this also applies.

"Adequate gas piping and gas appliances must, if they are provided for in new building construction, be written into the specifications by the architect.

"2. That consideration be given to selling gas appliances to architects, plumbers, and builders at a small profit or no profit, in order to get sufficient of the proper quality of gas appliances in all new homes and apartment houses.

"3. That special meetings of architects, plumbers, and builders be held in each gas office to secure greater understanding and cooperation.

"4. That an annual architectural display of gas appliances be made on every gas company floor on a date agreed upon by the Producers Council of the A.I.A. and the American Gas Association, and that publicity be given this display.

"The Managing Committee of the Commercial Section is requested to consider the following recommendations:

"1. That the American Gas Association employ an architect or a good publicity man, with architectural training, to contact editorial, architectural, and general specification specialties in an authoritative way and to assist gas company members in any practical way.

"2. That the American Gas Association subscribe for advertising space with the Architects' Small Home Service Bureau, so that they will include in their general literature and specifications necessary information on gas outlets and gas appliances.

"3. That an advertising appropriation be provided to help sell in 1930 the story of gas in architectural, plumbing, heating, and building journals.

"4. That the 3 to 5-year program, as recommended by Mr. Robert B. Mahn, be continued and worked on by the 1930 committee.

"5. That the geographic sections of this Committee study national building conditions and problems be continued in 1930.

"6. That an *Architect's Gas Manual* be immediately prepared by the American Gas Association. This manual to tell the story of gas to the architect and builder in a form not too condensed nor technical.

"7. That the Publicity and Advertising Section be asked to prepare suitable direct mail advertising of an educational and sales nature designed for the purpose of selling the idea of the necessity and desirability of providing adequate gas piping and spacing, etc., for the proper installation of the most modern gas appliances for every purpose for which gas is the logical fuel.

"Finally, the Gas Industry must realize that gas, irrespective of its superiority as a fuel, must be sold to the public by the Gas Industry.

"That while architects and builders may be favorably inclined towards gas, they will give the public what the public wants and demands.

"It is the Gas Industry's responsibility, and not the architects' and builders', to make the public *gas conscious.*"

Incineration by Gas

The Committee on Incineration by Gas, F. C. Hoffmann, Chairman, made the following recommendations:

"That all gas companies give more attention to the subject of "Incineration by Gas."

"That executives back their companies' efforts no matter how small the organization.

"That more personal contact work be done with ar-

chitects and realtors—as being the best source of prospects.

"That companies approve larger expenditures for sales promotion.

"That the greatest of care be given the installation of incinerators so that their use will not prove obnoxious in the neighborhood and thus prove a sales resistance for the future.

"The domestic gas load has been the subject of much deep study during the past few years. Every foot of gas used in the home has its bearing on the subject. The incinerator is just another means of making up some of the loss due to changed living conditions. It is up to each gas company to make this load worth while."

Manufacturers' Section

Ely presents important paper on appliance simplification

ALTHOUGH the Manufacturers' Section was somewhat short it must be remembered that they "did their stuff" by way of the most remarkable collection of exhibits ever displayed at a gas convention. In other words, they let their wares speak for themselves and they assuredly "said a lot."

F. G. Curfman,
Chairman-Elect, Manufacturers' Section

Simplifying Appliances

Edwin W. Ely, U. S. Bureau of Standards, in his paper, "Simplified Practice in the Gas Appliance Industry," told what had been done by the Government in eliminating patterns and the like in many lines of endeavor. Touching upon the Gas Industry, he said:

"Your chairman advised me last May of your purpose to study the possibility of simplifying gas appliances, especially stoves. In view of your declared intention it will be interesting for you to know that the American Society of Mechanical Engineers in 1921 listed 1000 opportunities for simplified practice. In that list appeared the following gas appliances:

Fixtures	Heaters	Mantels
Meters	Ranges	Valves

"Much in the way of standardization has been done in connection with these items, but no organized cooperative effort to eliminate the non-essential varieties has ever materialized, except in the instance of ranges and this effort is alive today."

* * * * * *

"I do not say that an individual manufacturer in applying simplification to stoves would not gain any benefit by acting strictly on his own initiative, without reference to what his associates are doing. I *do* say that complete relief for the entire stove industry would not transpire in the absence of a consciously coordinated and concerted plan of action. With such a plan put into operation all concerned should reap some good —manufacturers of stoves, retailers and wholesalers, gas companies, purchasing agents, advertisers, craters and shippers, architects (who design the rooms in which stoves are placed) property owners, builders and contractors and—most of all—the ultimate purchasers and users of *the* stoves.

"For the gas companies, stoves are a means to an end. However, it is part of the gas companies public relations activities to see to it that its patrons receive not only a steady flow of gas but also efficient devices for utilizing the gas. If a stove sustains interrupted or discontinued use for whatever reason, less gas than normally will be burned. The difficulty of replacing a broken gas cock, an oven door handle, or a length of pipe, may be at the bottom of a falling-off in gas consumption.

"There may be extant hundreds of sizes of handles, or there may be only one size of handle made in a thousand variations in respect to the thread diameter and pitch. This confuses not only the owner of the stove but it is a source of annoyance to the purveyors of gas, especially in those instances where a consumer moves his stove from the jurisdiction of one gas company to that of another.

"A stove is a combination of elements, such as legs, ovens, cocks, pipes, bolts, machine screws, etc., each of which are now produced in a multitude of different sizes and varieties. If the American Gas Association is thinking seriously of simplification, the initial step might best be confined to one or more of these elements rather than extended to include the entire cooking unit.

"A questionnaire to all the manufacturers would elicit the needed facts concerning production and sales, upon which to build a recommendation. If it becomes apparent that 80% of the demand (for example for the item being studied is concentrated upon 20% of the variety offered, then it could be determined which varieties of that item are rarely demanded and therefore superfluous.

"A list could then be devised that contains only those sizes, etc., which the industry desires to retain because of the outstanding demand they enjoy. That list would constitute the agenda for a general conference of all interests, and would be the data finally submitted to all concerned (gas companies, manufacturers, and others) for signed acceptance.

"The Simplified Practice Recommendation, bearing the names of all who had recorded their signed acceptance, would then be published by the Department of

Commerce and made available to everyone that has any interest whatever in gas stoves. The schedule, as printed, and bearing a definite effective date, would be placed in care of a Standing Committee (composed of representatives of the manufacturers of stoves, distributors and users) of the industry for study and revision once every 12 months. Thus the list would be constantly flexible in the hands of the industry, and ever susceptible of being altered to conform with current conditions, new invention and development of the art of stove design.

"With such a program successfully launched, it would be practicable for your industry to develop similar recommendations covering others of the many commodities produced and used by the trade. In the course of time much of the dead wood would be disposed of, and a great deal of "frozen capital" released for more constructive purposes."

Publicity and Advertising Section

Important and varied papers show Gas advertising to be hitting its stride

PROBABLY in no phase of gas company work has there been made greater advancement than in publicity and advertising. Not so many years ago the quality and variety of copy was certainly nothing to "cheer" about. In other words, gas company advertising and publicity lagged considerably behind similar work in other fields. This condition by no means applies now and the industry's gas advertising can hold up its head with pride in any company. Also, in addition to quality, many companies are spending sums of money for advertising commensurate with the needs of the volume of business obtained.

James M. Bennett, Chairman-Elect, Publicity and Advertising Section

Bivens On Cooperative Advertising

Regional and Cooperative advertising came in for considerable attention and discussion the latter being well handled by Frank H. Bivens, Southern Counties Gas Company, Los Angeles, in his paper "Cooperative Advertising on the Pacific Coast." Mr. Bivens had the following to say:

"Realizing that Cooperative Advertising has become the vital factor in the new competition between industries, and that the gas industry is no exception to the rule, the Pacific Coast Gas Association through its Commercial Section recommended the undertaking of Cooperative Advertising by the gas industry on the Pacific Coast.

"The first step was the appointment of a Ways and Means Committee composed of three major company executives, who were requested to provide the necessary funds and suggest the ways of Cooperative Advertising.

"The Ways and Means Committee provided a fund of approximately $15,000, securing this amount from only four of the large companies, based upon an assessment of 2c per meter. The Advertising Committee of the Association was requested to submit a plan for a six months' campaign, which could be conducted for $15,000, and could be enlarged, providing the other companies in the Association approved.

"The Advertising Committee, whose membership is made up of the men directly in charge of advertising and publicity for the four large companies on the coast, after due consideration and consultation with expert advertising agencies, recommended the following plan. This plan was adopted, and is now in operation—

"That the funds available be divided equally between the advertising mediums considered most advantageous to Cooperative Advertising.

"Radio Advertising and Trade Journal Advertising.

"The slogan of the campaign is —'The Modern Fuel—GAS—Quick, Clean, Sure.'

"The objectives of the campaign are as follows—

RADIO ADVERTISING

"To reach home consumers, consisting of a program, informative and educational to make the public particularly housewives 'gas-conscious.'

"To overcome the growing tendency to think of gas as an 'old fashioned' fuel.

"Selling the idea of what gas can do through the use of modern appliances.

"Elimination of difficulties due to faulty adjustments or obsolete equipment, thus building up good will and confidence.

"Stressing the modernity of gas, and the things that can be accomplished with the newer appliances—their speed, cleanliness and efficiency.

"Encouraging the purchase of new appliances, and greater and more efficient use of all appliances old and new, with the ultimate objective of increasing gas consumption.

"The Radio Advertising to be weekly broadcast through the "Women's Magazine of the Air" over the Pacific Coast Net Work of the National Broadcasting Company, consisting of stations located in—

"San Francisco, Oakland, Los Angeles, Portland,

Seattle, Spokane.

"Each weekly program to consist of a twenty-minute chapter, composed of music—both instrumental and vocal—a seven-minute talk by Helen Webster well-known Domestic Science authority, concluding with music and a thought for the day.

"Some of the subjects covered by the Radio Talks are —The Modern Fuel for Modern Homes.

Oven Canning
Oven Cooked Meals
Hot Breakfasts
Gas Refrigeration
House Heating
Water Heating

and other subjects of interest to the housewife. Each of the talks are prepared by Helen Webster and the committee.

"In a number of the Radio Talks, listeners will be invited to ask for free adjustment service in the event of trouble or dissatisfaction with their gas appliances.

"As a tie-in, listeners are asked to call on their local gas company or their radio station for a book of recipes, entitled—'Home Cookery With Gas.'

"Cooperating companies are using local newspaper advertising, urging the consumers to listen in on the radio programs, also window and counter display cards are available for gas company offices and dealers, announcing these radio programs.

INDUSTRIAL OR TRADE JOURNAL ADVERTISING

"Advertising in Trade or Technical publications devoted to the following specific industries:

Machinery
Building
Baking
Restaurants, Hotels and Caterers
Confectioners
Plumbing and Heating

"This consists of page ads each month in such publications as—

Western Machinery World
Engineering News
Western Baker
Western Hotel Reporter
Pacific Builder & Engineer
Western Confection
Western Plumbing & Heating

"These industrial ads demonstrate by fact or actual examples that gas is an efficient and an economical fuel for specific industries.

"This Cooperative Advertising and Sales Promotion Campaign began with the first radio program on August 14th, and will continue each Wednesday morning at 10:15 until February 5, 1930—twenty-six radio programs in all."

The Crux of the Matter

"Why Gas Companies Advertise," by William H. Hodge, Vice-President, Byllesby Engineering and Management Corporation contains much sound information and suggestion. It is reproduced in full below.

"The American Gas Association is to be congratulated upon the forward-looking spirit which caused it to give particular attention to the subject of advertising —as evidenced by the existence of the Publicity and Advertising Section. If anyone is interested in developing the market for almost any product in this day and age, neglect of advertising is nothing short of folly.

"The notion that advertising adds to the price of a product is still a persistent one. The sophistry that utility companies advertise in the newspapers to insidiously influence editorial opinion is still advanced by those anxious to tear down these industries. Both are fallacies and as fallacies should be attacked at every opportunity.

"It is common knowledge that the lowest priced articles in respective classes are the ones most largely advertised. Whether it is soap, shoes, automobiles or gas, this is generally true. Mass production of sales *must* use advertising. It is a contrast between popular and class appeal. Compare the Chevrolet and the Rolls-Royce.

"About the second example of mass production in the modern world was the gas industry. The first was water supply. In the gas plant the engineers assembled in one place operations replacing activities formerly isolated in homes, stores and factories. With the aid of distribution systems they substituted the results of mass production for the results of individual production.

"The economic principle was sound simply because increasing volume of production and greater use of the investment over more hours per day and days per year progressively brought about lower costs of production per cubic foot of gas. If the rule had been the other way the gas business would not have flourished and its step-child the electricity supply industry never would have started. These two industries showed the way to modern industrialists, such as Mr. Ford. They paved the way for what has become known as the great American principle of industrialism.

"All this being true, and it being granted that mass production and distribution are absolutely vital both to the widest possible extension of the service and the progressive lowering of cost and price, how can it be contended that gas and electric companies should not advertise? Here is a situation directly and seriously affecting at least 65 per cent of the people of this country wherein the success of mass distribution is dependent upon the success of mass appeal, and a speaker is invited on your program to explain why gas companies should advertise.

"Of course, the desire to have such a discussion does not come from within the industry but is the outgrowth of the efforts of the certain newspapers, to make it appear that the advertising expenditures of the utilities are largely in the nature of bribes for the purpose of securing favorable treatment from newspaper publishers and editors.

"These misrepresentations are a challenge, not only to the utility managers but to the integrity of newspaper publishers and editors. They are serious but they are not true. Such charges rest on nothing more substantial than suggestions from individuals connected with utilities that more advertising should be done, coupled with the opinion that such a course would help toward better editorial opinion. Also upon a few foolish letters and remarks by men speaking their own thoughts, and not representative of any substantial part of the whole industry.

"Measured against the facts as they exist and against the reputable part played by skillful advertising in developing the utilities with unprecedented rapidity, the so-called evidence on which these attacks are based is something less than inconsequential. It is in fact puerile, and this is why I say that some newspapers

have set up a picture so distorted and false that it is entitled to no standing at all.

"The demagogues devoting themselves to the utilities would like to have every editor feel that his readers believed him bought if his paper carried gas or electric company advertising. They would cheerfully deprive these industries of the right to advertise at all, if they dared to propose such a thing. Meanwhile they sow what suspicion they can in the hopes that the utilities will be discouraged from advertising and the publishers will be afraid to solicit such business.

"Tactics of this character are powerless against integrity and backbone, and neither the newspaper publishers or the utility managers of this country are conspicuously deficient in these particulars. While the immediate effect has been to retard utilities advertising, in my opinion, in the long run it will have no appreciable effect upon the effort of the utilities to employ advertising to the best economic advantage.

"According to information supplied by the secretary of your section, Mr. Howard F. Weeks, careful estimates show that approximately $2,500,000 was spent for gas company advertising in the year 1928. This represented a percentage of 0.6 of the total gross operating revenues of the industry. The amount spent for advertising space in the newspapers is estimated at about $1,400,000 or 56 per cent of the total advertising expenditures. There are about 14,500 newspapers in the United States. Assuming that only half of them are published in gas company territory this would mean an annual advertising expenditure of $190.00 which seems a pretty low price for the alleged sale of editorial integrity.

Comparative Advertising Expenditures

"It may be interesting to compare the advertising expenditures of the electric light and power companies with those of the gas industry. Estimates which I have made indicate that the total advertising expenditures of electric light and power companies in 1928 amounted to about $13,000,000, or 0.68 per cent of the gross revenues. You will observe that this percentage of gross revenues is only 0.08 per cent greater than the percentage spent by the gas companies. In other words, the two industries are not far apart in relative advertising effort.

"The proportion of total advertising spent by the electric light and power companies for newspaper advertising space was about $8,400,000 or 64 per cent of the whole. The remainder went for direct-by-mail, outdoor, poster, radio and other mediums of advertising. In the gas business it would appear that about 53 per cent of advertising expenditures is for merchandising appliances, while in the electric industry about 44 per cent is spent for this purpose.

"The fact that a large part of both gas and electric advertising is done through mediums other than newspapers in itself shows how these industries regard advertising effort as a necessity in building up the business. No one would consider the employment of outdoor advertising an effort to bribe the outdoor advertising industry, or the use of direct-by-mail advertising as an attempt to corrupt the Post Office Department.

"The total of both gas and electric advertising in the newspapers of the United States in 1928—an estimated sum of $9,800,000—is a long ways short of the $38,000,000 which it was charged the electric industry proposed to spend over the period of one year for the alleged purpose of 'influencing editorial opinion.'

"There is one way that utilizes advertising which may influence editorial opinion in a most legitimate manner. That is by the influence of the facts themselves in the advertising aided by the manner in which they are presented. The object of all advertising is to have an influence on the minds of people and if the advertising itself is honest, there can be no more harm in the conviction it carries to the editor's mind, than its appeal to any other mind.

"It is interesting to compare the percentage of gross operating revenues spent for advertising by the gas and electric utilities with those of various other industries. Figures compiled by the Dartnell Corporation, a statistical and reporting agency, for the year 1928, afford this comparison. The following percentages compare with 0.6 for the gas industry and 0.68 for the electric light and power industry, and are as follows:

Percentage of Gross Sales Invested In Advertising by Various Industries

Auto Accessories	6.19%
Autos and Trucks	2.16
Building Materials	5.70
Cigar Manufacturers	7.60
Men's Clothing	2.25
Women's Clothing	3.10
Confectionery	5.87
Electrical Appliances	7.50
Financial	.58
Food Products	8.75
Furniture	4.70
Hardware	3.46
Jewelry	11.00
Laundry Equipment	8.27
Mail Order Houses	15.30
Paint and Varnish	2.81
Fountain Pens	12.55
Radio	7.30
Proprietary Medicines	27.25
Tires	2.04
Schools and Colleges	10.40
Toys	5.60
Wholesalers	2.19
Retail Groups	
Department Stores	3.67
Grocery Stores	1.83
Drug Stores	2.76
Men's Furnishings	3.16
Hardware Stores	1.12
Furniture Stores	3.72
Lumber Dealers	.30
Shoe Stores	2.65
Jewelry Stores	3.10

"If there is anything wrong, morally or commercially, about gas company advertising today, it is simply its inadequacy. In other words, there is not enough of it being done. The industry can employ to advantage advertising in its various forms to a much greater extent than is the case at present. If this were done the pace of development would be accelerated, the maximum benefits of gas brought to many additional people in quicker time, and volume of output built up so that the price per unit of service could be more rapidly reduced.

"We in the gas industry have nothing to fear from doctrinaires and demagogues if we look the situation squarely in the face and defend ourselves manfully and intelligently. We are playing a most important part in the welfare and progress of the nation and if we continue to fairly fight our own battles with clean weapons, the public will not only treat us right but will applaud us."

Accounting Section

Section meeting delves into the intricacies of correctly keeping the industry's cost data

IF there is any human institution that is older than accounting it has never been brought to light. The most primitive races employ some method of accounting in carrying on their affairs, no matter how crude. Accounting, after the day's work is done, so to speak, tells us exactly where we stand. It probes the subtleties of our business with the tools of mathematics and logical reasoning and in the last analysis advises us in plain black and white whether we are making any money. In addition, it assists us in bringing to light the weak points in any operation.

Accordingly, any one who labors under the idea that accountants are merely the old-fashioned bookkeepers masquerading under a fancy title is not only standing in his own light but is deluding no one but himself.

J. L. Conover,
Chairman-Elect, Accounting Section

Many really excellent reports and papers were presented before the Accounting Section and they but served to show that the Accounting end of our business is increasingly throwing light on what our business is costing us, where it can be economically strengthened, and how much money we are really making.

Madden On Accounting

John T. Madden, Dean, New York University School of Commerce, Accounts, and Finance presented a fine paper which is especially recommended for reading by every one in the Industry who is forward looking. His paper follows in part.

"It is a privilege which I greatly appreciate to be invited to address you on the topic assigned to me. Your invitation recalled to my mind another contact with your association about a year ago, when it was my pleasure on behalf of New York University to extend to this association the use of our School of Commerce classrooms for a special course in salesmanship which the association conducted for its members. We hope that you may find it convenient at some future time to avail yourself again of our facilities. One of the many things that we at the University are proud of—in addition to our football team —is the close association which has always existed between New York University and industry, for our institution was founded in 1831 by some of the leading business men of the community who visioned with remarkable foresight the future needs of our nation. Its founders believed that the scheme of education in vogue at that time required a strong dose of liberalism and that the facilities of a University should be related to the practical affairs of life. The movement begun in 1831 at New York University was followed subsequently by many other institutions with the result that today, we find a close liason between industry on the one hand and the college and its professors on the other.

"Every school in the various universities has had a share in this development. Our colleges of agriculture exercise a potent influence in the development of that industry. Our schools of medicine make their contribution through programs of public health, sanitation, and preventive medicine. Our veterinary colleges contribute their quota of graduates who, among other duties, safeguard the food supply of the nation. Our colleges of liberal arts have brought into community life the refining and cultural influences so necessary in a well ordered state. Our schools of law, in conjunction with our colleges of liberal arts and the graduate schools, cooperate in the development of a sound legal philosophy. The marvelous development of our industrial machine is based in large measure on the work of our faculties of engineering. The graduate work of our universities in physics and chemistry produces the fruits of research in the field of pure science which the applied scientists of industry utilize in production. And who shall measure the beneficial effect which is produced by our schools of commerce, which annually turn into the stream of business life several thousand graduates who are equipped with the technical and cultural prerequisites for a more perfect citizenship?

"We have undoubtedly reached a point in our industrial development where a pause is necessary in order that we may intelligently appraise present conditions and tendencies. The series of changes of the post-war period have taken place so rapidly and the pressure upon those most actively engaged in the economic struggle has been so unrelenting that scarcely any serious thought has been given to the problem of ameliorating some unhappy conditions which accompanied our industrial growth. These mal-adjustments have not entirely escaped the scrutiny or observation of some of our industrial and financial leaders. And while we are yet some distance from reaching a solution to these vexatious questions, I have no hesitancy in asserting that a socially beneficial result will be due in no small measure to the intelligent and enlightened cooperation of the university and industry. Let us have more of it.

"Within industry itself however, many of these mal-adjustments are problems which paramountly fall within the area of cooperative effort on the part of accountant and management. The Federal Income Tax returns show that about forty per cent of the corporations in this country present each year tax returns that are of no

interest to the tax-gatherer. It is evident that there exists a tremendous amount of economic waste because losses on operation fall either upon the creditors or the owners, with the probability also that labor suffers from lower wages. On the other hand, a certain group of consumers obtained goods from these corporations at less than the cost to produce plus a fair return on the investment. There resulted, therefore, an invisible shifting of wealth from one group in society to another. Obviously there was some bad management and probably inadequate accounting as well. Accounting is the science which concerns itself with the compilation, recording, and presentation of financial facts, principally for the purpose of presenting the results in the form of two statements, viz., the balance sheet and the income account. Closely allied to this science is the science of statistics, which some might say embraces also the science of accounting. The accountant furnishes much of the raw material with which the statistician works. The latter, by applying scientific processes, presents the data in a form and under a method which reveal quantitative data in their true relationships. There are distinct limitations to strictly accounting processes and these are overcome by the statistician who, by graphs, charts or tables, or a combination of them, develops long time trends or presents the salient facts concisely and clearly with seasonal and other elements precisely adjusted. Hence, in thinking of the relation of accounting to management, we must necessarily include statistics.

Necessary Facts Furnished

"Accounting furnishes to management the necessary facts upon which to base executive decisions; it also establishes the means by which results may be controlled. Instead of proceeding haphazardly, management is in a position to know at all times what has taken place, what the present conditions are and what is likely to take place in the future. There is a tendency to regard the operations of the counting room as a part of the overhead which must be endured. There are some managers of responsible businesses who fail to secure from this element of expenditure even a small part of the benefit which may be derived. They seem to be content with the minimum of helpful information which comes from the usual balance sheet and income statement and, if the suggestion is put forward that additional necessary expense be incurred to broaden the scope of the usefulness of this department, it receives scant courtesy. Proper and judicious accounting expense is the cheapest form of insurance which management can secure if a healthy income account is to be maintained.

"Many executives do not realize that under modern conditions the experience of the past is becoming of less service to the executive in determining policies for the future. Moreover, business is dynamic and each period presents its own peculiar problems which have no counterpart in past experience. Mr. Alvan T. Simonds has recently called attention to the fact that since 1920 the major cycles of industrial production show that each cycle is approximately of three years' duration, that each successive peak is higher than the preceding peak, and that each successive peak comes later in the year than in the preceding cycle. I mention this as merely one of the factors which the modern accountant must take into consideration when engaged in interpreting results. It is clear that past results, when presented statistically, indicate trends but the results of any one year taken alone are of limited value as safe guides for the future. In a study which I made several years ago for the National Electric Light Association and which it published, the fluctuations in industry were clearly indicated from the income tax returns of business enterprises. Hence, the accounting function is an integral part of the economic process which should be fully utilized by intelligent management. But, if the accountant is an aid to management in determining future policies, he is also the registrar of management's success and failure.

"A certain percentage of the consolidations that have taken place was motivated by the necessitous desire to avoid losses in operation. Prohibited from price-fixing by the Sherman Act, under which the tendency would be to raise prices so that poorly managed businesses would make extraordinary profits—weak enterprises have been and are being forced out of business or merged with better managed ventures. In theory at least, this process results in bringing an increasing amount of production and distribution under the control of skilled management. The consolidated group will enjoy the benefit of better equipped research workers and laboratories, higher grade engineering and accounting services.

"On the other hand, large scale organization carries within itself the germs of its own destruction. There is a point at which the law of diminishing returns will begin to operate. Experience has shown that much of the anticipated savings from mergers never materializes. If prices do not fall, or if they are increased, the basis is laid for the demand for government interference of one sort or another.

"Successful operation of modern large units requires arbitrary power in the hands of the directing genius, who must make policies and decide all major questions. This concentrates power in a form that lends itself to attack from the outside and opens the door to all kinds of quack legislative panaceas. The responsibility in the hand of the manager is as great as that of the commander-in-chief of the army in time of war. The manager must fortify himself with facts; he must seek advice and counsel; he must consider the psychology of a business situation. The accountant who is to advise intelligently must be trained to meet his responsibilities of the new era. Wise managers and intelligent accountants are absolute prerequisites in the public utility business.

Primary Purpose of Business

"Obviously the primary purpose of business is to make profits; and it has been well said that profits are the life blood of business. Society has the natural right to regulate industry if industry shall require it; and ultimately society will regulate industry, if industry will not meet its social responsibilities.

"In the era of smaller competing units we justified the suppression of certain facts in financial reports on the ground that each enterprise had the right to take certain precautions against its competitors. But as competition is gradually eliminated this precaution no longer has its former justification. Hence, we rightfully expect more frank disclosures in the financial statements of giant corporations. Thus, in Great Britain, under a new act which will come into operation shortly, certain information must be given in regard to Directors' remuneration, and the Directors in their report will be required to state the amount of profits carried or proposed to be carried to any reserve appearing in the balance sheet. This act, by the way, also defines a subsidiary company as one in which more than 50 per cent of the issued share capital (whether held directly

or through a nominee) is held as an asset of the parent company; or one in which 50 per cent of the voting power is in the hands of the holding company; or one in which the holding company has power directly or indirectly to appoint the majority of directors. I mention these changes as evidences of tendencies which may result in still further operative interference through legal enactment unless industry of its own volition by frankness in financial reports shall obviate this necessity. A study of the act referred to will be of paramount interest to all accountants and managers.

"The complicated network of modern industrial organization must be kept in a healthy condition. This is the problem of management, whose functions have become fiduciary in the most exacting sense. For management not only must account to its shareholders but also to society which extends certain privileges and confers certain rights safeguarded by law. It is evident then that honest and independent accounting is a necessary correlative to the fiduciary relation. Hence, it seems to me that the accounting function must become even more important in these days of large scale organization. It is true that these giant companies could not have existed unless the accountant had perfected the mechanism by which the results of operation could be ascertained and the activities controlled. But if we reflect upon the increased social responsibilities of the large industrial unit, then it seems to me that an entirely new and enlarged vista of the accountant's responsibilities and duties is presented. From the social standpoint he is a factor as important as the production manager or sales executive.

"The prudent man will not attempt to dogmatize in matters of account reporting where there is such a wide area for honest divergence of opinion. The question has its legal aspects as well as its social aspects and the element of expediency is ever present because the extent to which disclosure is harmful to the best interests of a business enterprise cannot be determined a priori. But, if I may venture a recommendation, it would be that accounting should be placed more on a parity with management. I fear that unless this is done we may experience more rigid governmental regulation of accounting in general. The accountant knows that even the most carefully prepared statements have their limitations. Recognizing these limitations more acutely than management does, the accountant is perhaps better able to give impartial advice which will safeguard the interests of the enterprise while at the same time disclose essential truth to investors and the public.

Women's Meeting

Spirited meeting demonstrates the need for the woman in guiding the Industry's affairs

THAT the women in the industry are taking a keen interest in their work was evidenced by the large and enthusiastic gathering which attended the Women's Meeting held Monday afternoon at the Committee Room of the Crane Company's Permanent Exhibit opposite the Auditorium.

Many papers were presented of especial interest to women engaged in the gas industry.

Service Counsel Duties

Miss Jessie McQueen, recently appointed Home Service Counsellor at Association Headquarters spoke on the duties of the Home Service Counsellor and how the Counsellor can be of most assistance to company members whether they have Home Service Departments or not.

Some of the duties she outlined as follows:

"The Home Service Counsellor should maintain close contact with schools and universities which are giving a course of instruction connected with household appliances of all types and should serve as an adviser, wherever possible, to faculties directing such courses. Gas appliance instruction in all of the schools teaching home economics is of greatest importance and I do not think that the attention of the Home Service Counsellor to such work can be stressed too much.

Ruth Soule,
Chairman-Elect, Women's Section

"She should be thoroughly acquainted with the entire scope of home service activities and be prepared at any time to plan and to organize a new department in any company desiring her assistance.

"The Counsellor should assist employers in securing qualified home service workers and keep a list of those available for such service, this involving a certain number of interviews with available people.

"The Home Service Counsellor as a representative of Home Service at the Headquarters of the American Gas Association should be of valuable assistance to the gas industry by making her department a clearing house for all information pertaining to Home Service Work. The Home Service news may be the organ by which this information is disseminated.

"The Counsellor should be familiar with and make reports on research being conducted by scientific and

educational departments in the interest of home welfare as it affects the industry. Also with the operations and work of the Testing Laboratory and any developments in the field of manufacture of household appliances. This technical information of the gas industry should be condensed and couched in somewhat simple terms for immediate use by the Home Service Directors in their lectures before their women's groups.

"A plan of information should be maintained as to the adoption of policies by different Home Service departments and to pass along the information thus obtained to other companies. In order to further carry out this plan and know the particular problems peculiar to various sections of the country visits should be made to the Home Service Departments of companies at intervals, trying to cover a large part of the available field within a year. In these visits the Counsellor should obtain the viewpoint of the executive in charge and of the Director and make an analysis of the proper functioning of the department. Constructive criticism should be given wherever possible."

Advertising Influence

"Advertising in a Public Utility" was the title of a very instructive paper on the subject by Anna Belle Turner, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.

Miss Turner in her address stressed the importance of advertising to the community the service the company is rendering. She describes public utility advertising as follows:

"A gas company might just be a manufacturer and distributor of gas; and electric company ditto of electricity. But a public utility is the power to satisfy human wants for the community at large—community usefulness. And that certainly is the actuating motive of our industry.

"But how many members of a community would naturally think of us in those terms. Not many. They're too busy thinking of their own immediate concerns. The gas or electric company may be to them merely the place where they pay their bills. So we must do more than provide good service. We must tell the public how they can benefit by what we have to offer. It's up to us to interpret our service in its many applications to daily life in our communities. That's public utility advertising.

"The beauty of it is that we have so much to tell. If we do our job well we should be able to create a lively interest, a public appreciation, an increasing volume of business, a decreasing unit of cost and in this ever-widening circle of benefits, more and more comforts and conveniences."

In summing up she says:

"Advertising in a public utility is a friendly get-together between company and public, with the company on the reception committee.

"We know we have something worth-while to offer. There's a rig of sincerity to our advertising because we are sincere."

Women Membership in A. G. A.

Miss Mary Spear, in charge of membership at the A. G. A. Headquarters spoke on the benefits of the A. G. A. Membership for women in the industry. In referring to the benefits derived from such a membership she says:

"Are you interested in Accounting? Then why not have the benefits of the reports sent out by the Accounting Section. Why not have representation in that Section, attend the Sectional meetings? Are you interested in sales, both of the appliances and the Commodity, then why not enroll in the Commercial Section? Are you interested in Advertising, in the Publicity work of the Company? Why not enroll in that Section and have all the interesting information sent out by that Department. Do you do any work for the gas measurement department of your Company? There is lots of information and help you could get from Headquarters. In fact there are so many phases of the work that I might spend a long time telling you all about it. It would be much easier for you to be a member, and learn that way.

"Then too and here I might sound heretical, but why should not the women have a place on the various committees. Why not have representation in the various sectional meetings. If you can do the work, and I am sure that you can, why not take your place in the sun along with the rest of the gas men. And at that, I am not so sure that I am uttering heresies, after all. Last year at the Women's meeting, Col. Fogg in addressing us said, 'It is all right to set aside one afternoon out of a week for a meeting, but it would be very unfortunate if we gave the impression that we expected you to remain silent the rest of the year.' We have no idea of trying to emulate the N.E.L.A. with its widespread women's organizations but we do feel that there should be more attention given to increasing the personnel of the women in the organization; that we should have more women on our Committees and that they should have more part in Association Activities, aside from the Home Service Work. If I might quote Col. Fogg again, 'I think your place here reaches far beyond the limits of one afternoon's meeting. There should be a place for you in every meeting.' "

Home Service Meeting

A well thought out program on the phases of Home Service work was discussed at the Home Service Roundtable held Thursday afternoon October 17th.

Mrs. Anna J. Peterson, Home Service Director of the Peoples Gas Light and Coke Co., Chicago, Ill., spoke on the advantages of reaching the public through the radio.

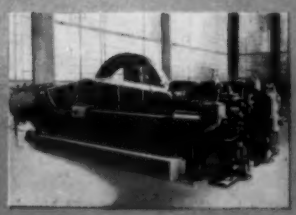
"Home Calls" was the topic of the paper read by Mrs. Bertha Harris, Connecticut Light and Power Co., Bristol, Conn. That this was a very effective means of building good will for the company was proved by the many incidents she cited.

"Ways of Reaching New Groups," by Miss Ruth Soule, Brooklyn Union Gas Company, Brooklyn N. Y., brought out many valuable ideas which assisted her in reaching clubs, church functions and other gatherings of women to which she could give demonstrations on the various gas appliances used in the home.

Miss Hulda Ungericht of the Columbus Gas & Fuel Co., Columbus, Ohio, was asked to tell of the benefits derived from the Gas Appliance Course held at the A. G. A. Testing Laboratory last June. She told in detail its assistance to her as a Home Service Director and recommended it to other directors as a means of becoming better acquainted with the different mechanical features of the various gas appliances now used.

500 B. H. P. Cooper-Bessemer Gas Engine driving a rotary type blower in the North Shore distributing station of The People's Gas, Light & Coke Co.

Cooper-Bessemer Type-19 is built in standard sizes from 200 to 760 B. H. P. in four combinations of cylinders for compressor service.



Cooper-Bessemer Type-80 is built as a single cylinder — 85 B. H. P. or as a twin cylinder — 170 B. H. P. unit for compressor and booster service.

LOW-COST, RELIABLE POWER FOR PEAK OR LOW LOAD SERVICE

For peak loads, for emergency service, for high pressure transmission where the load factor is low — in these specific applications Cooper-Bessemer Engine Compressors, operated on manufactured gas, are decidedly more economical than either steam or electricity. There is no steam to maintain during idle periods; there is no maximum demand charge to pay. Every cubic foot of gas used in these engines *produces power* — power that is not interupted by thunder storms nor accidents to the electric transmission line.

The first Cooper-Bessemer Gas Engine installed in 1909 has been in constant service ever since. Write for facts and figures on Cooper Engines for manufactured gas distribution.

THE COOPER-BESSEMER CORPORATION

Formerly The C. & G. Cooper Company and The Bessemer Gas Engine Company

Mount Vernon, Ohio — Grove City, Pennsylvania

Branch offices in all principal cities

COOPER BESSEMER

YOU'RE ALWAYS SAFE IN CHOOSING A COOPER-BESSEMER

These new

The THOR Agitator Washer

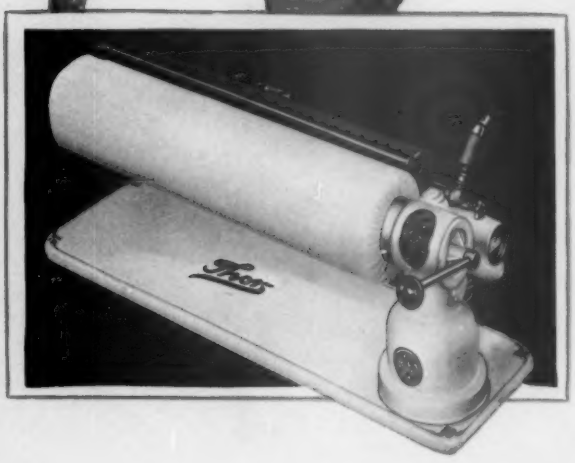
The fastest washer made. The tub is oven-baked porcelain enamel, inside and out. Lid is rubber guarded — rattle proof and splash proof. Fitted with gas burner under tub. A beautiful washer—made to give outstanding satisfaction and years of trouble-free service.

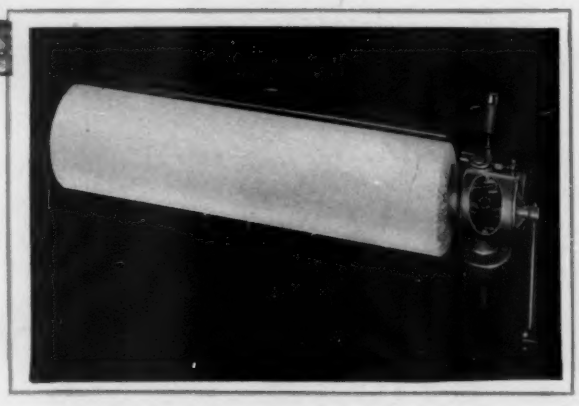
The THOR Table Model Gas-Heated Ironer

The Thor Rotary Iron with gas-heated shoe can be used on any convenient table. Has ironing surface of 10 flat-ironers. Anyone can operate it with 10 minutes' practice. Irons everything 75% faster than by hand. Presses men's trousers and women's skirts.

THOR Ironer for Combination Washer and Ironer

The Thor Rotary Iron with gas-heated shoe fits over the wringer shaft of the Thor washer to make a complete washer and ironer combination. It is as easy to change from washer to ironer as changing a phonograph record. The complete combination sells for about the price formerly asked for a good washer alone.





WORLD'S LARGEST MANUFACTURERS OF WASHING AND IRONING MACHINES

Gas-Equipped *appliances* by Thor

tap new profit mains for gas companies

AN entirely new source of revenue for Gas Service Companies has now been created by the addition of gas burner equipment in America's fastest selling line of washers and ironers.

For instance, a gas burner, with connections, has been installed underneath the tub of the famous Thor Agitator Washer. While previously noted for its efficiency, the addition of the gas burner now promises to multiply the demand for this popular washer.

It has made it possible to keep the water in the tub heated to the proper temperature throughout the washing period. Simply fill the tub once and light the gas. No cooling off. No adding hot water. This is an important improvement because every woman knows that *fast* washing and *clean* washing requires hot water.

Likewise, the Thor Table Model Ironer, and the Thor Rotary Iron (for combination washer and ironer) have been fitted with a gas-heated shoe. Note the descriptions above. The sale of Thor Ironers is increasing at an amazing rate because they are speedy and efficient and because they sell at a price every household can afford.

In promoting a more general use of these Thor products, Gas Service Companies are promoting their own as well as their customers' best interests. Territory allotments are now being made. We invite your correspondence regarding our attractive dealer franchise.

HURLEY MACHINE COMPANY
22nd Street and 54th Avenue
CHICAGO, ILLINOIS
Dept. H-11

WORLD'S LARGEST MANUFACTURERS OF WASHING AND IRONING MACHINES

BITURINE COATINGS

Biturine Enamel *Biturine Solution No. 5*
Biturine Enamel Primer *Biturine 70-30*
Biturine Coupling Mixture

This group of protective coatings represents the fruits of more than 20 years of careful research and practical experience. Biturine Enamel and Primer are particularly adapted to the Hill, Hubbell & Company process of mechanically applying protective coating to the pipe at the mill.

The answer to the problem of pipe line protection

Machine Coated and Machine Wrapped Pipe

One of the most serious problems confronting the oil and gas industry is the depreciation of pipe after installation through corrosion.

In the past the best solution to this problem has been the coating of pipe in the field by hand. This method, however, is always attended by the costly and variable factors of labor and unfavorable weather conditions.

But now you can, in your initial order for pipe, specify Hill, Hubbell & Co. mechanical coating and wrapping treatment, through any of the mills listed below. This treatment gives you the fullest assurance of extended pipe life under all sorts of conditions, perfected by an organization which has pioneered for 23 years in the development of protective coatings for metal.

Kraft and Felt Wrapping Adds Protection to the Coating During Shipment

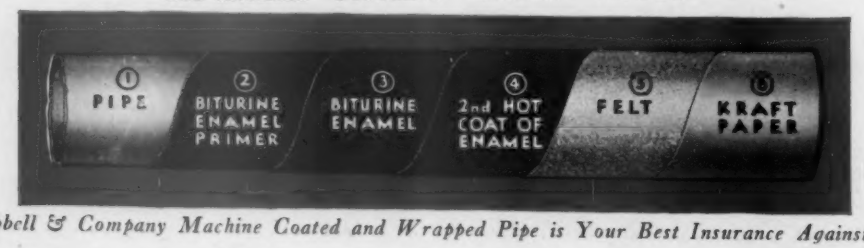
Pipe is delivered in the field, ready for weld and backfill, with uniform covering and protection. Every provision for the best possible applications of materials specified, and elimination of waste of material and labor, has been made.

Hill, Hubbell & Co. Pipe Coating and Wrapping Plants

Hill, Hubbell & Co. pipe coating and wrapping plants are located in the following cities for the production of the manufacturers of line pipe listed.

CENTRAL TUBE COMPANY, Ambridge, Pa.; SPANG-CHALFANT & COMPANY, Ambridge, Pa.; YOUNGSTOWN SHEET & TUBE COMPANY, Indiana Harbor, Ind.; NATIONAL TUBE COMPANY, Lorain, Ohio; A. O. SMITH CORPORATION, Milwaukee, Wisc.; YOUNGSTOWN SHEET & TUBE COMPANY, Youngstown, Ohio.

GENERAL PAINT CORPORATION
HILL, HUBBELL & COMPANY DIVISION
CHICAGO NEW YORK TULSA HOUSTON DALLAS SAN FRANCISCO OAKLAND
LOS ANGELES PORTLAND SEATTLE SPOKANE



Hill, Hubbell & Company Machine Coated and Wrapped Pipe is Your Best Insurance Against Corrosion

III—Comparative Fuel Costs

BEARING in mind the basic properties of the various fuels and the effect of these on the finished product, the next question in logical sequence is the comparative fuel costs of heating, considering all salient items.

In such a discussion, it is well to view the problem from two angles. The first is the basis of setting a sales price and the second comparing actual operating costs with fuels priced on a sound basis.

In the final analysis all prices are subject to the fundamental laws of supply and demand. The operation of this law must be regulated or influenced by competitive conditions. In the case of fuels, the selection is further complicated by the service or labor saving feature accompanying gas and electricity. The value of luxury of this kind penetrates from the top down, reaching to the laboring class last. Time and comfort are most appreciated by those people who can best capitalize these and least by those to whom the physical labor is commonplace.

Seasonal Coal Prices

Coal and oil for domestic use are unquestionably priced in full accordance with the supply available and the demands made for these fuels. It has always been the custom to have seasonal coal prices. The greatest demand occurs during the house heating season or from September 1st to April 1st. These dates are about one month before the beginning and end of the season, but the greatest demand occurs just before the starting of the furnaces in the Fall, in order that coal will be at hand when heat is needed. In the Spring "hope springs eternal" and heating is often a triumph of mind over matter during the last month. During these seven months there is a uniformly high price. On April 1st, coal prices are slashed to induce buying. This cut may be 50 cents or $1.00 per ton. The coal dealer expects to create business so that the mines, breakers and his own force can remain in continuous active service. Each month until September the price is advanced one-fifth of the cut. It is impossible with the data in hand to state how successful this method is of creating an artificial demand in periods when it is desired to prevent an oversupply. However, very appreciable savings in coal bills can be made by buying for the winter in April or May.

In the case of oil, the law is even more inexorable. Coal can be stored out of doors. Oil must be held in tanks or containers, the capacity of which is limited. With the stocks of refinery products up, the only reaction is one that will diminish stocks, that is, a break in prices. The movement to curtail oil production, wise and laudable as it is, can only begin to succeed when the demand more nearly approaches available refinery capacity. Starting and stopping units of equipment, whether they be lathes, delivery wagons, stills or complete refineries, is very expensive compared with steady continuous operation. This cost is not only that of the bare physical equipment, but more particularly that of personnel. As long then as it means laying off not only part of the equipment, but also part of the force, it is more economical for the oil producer to operate at high capacity and cut his unit profit than possibly to lose control of some of his market through reduced output. Sales costs are the largest items of a business and it is cheaper to hold business than get it back or gain new customers.

So much then for coal and oil. Their prices are absolutely based on supply and demand and wholesale customers always obtain somewhat lower prices than the retail customers. But when costs of gas are examined, it will be found that many types of prices or rates are in operation. In some natural gas territories, the flat rate still exists. This consists of a monthly charge based on the number of connected lights and appliances and is independent of the gas used. It is happily disappearing. With the advent of a meter, the consumption rate based on a uniform charge per thousand cubic feet was established. To make the use of gas attractive for the larger customers, the rate per M. cubic feet is lowered after a certain quantity of gas is used and as many as 6 or 8 such "steps" occur to make lowered rates for larger users. However, the examination of Gas Company operation discloses many costs which are not reflected in either of these rates. An arbitrary method of compensating for these costs produced the service charge, which being misunderstood by customers and generally resented, was modified to an initial charge at a fairly high rate for a small gas consumption, usually 200 cu. ft.

The "Scientific Rate"

Based on a true analysis of costs, the Rate Committee of the American Gas Association devised and advanced the so-called "scientific rate." This allocated all costs into four classes, and thereafter each such class is apportioned among the users. For all practical purposes, two of these classes of costs merge into one, simplifying the structure to a three part method. By developing this rate from the underlying costs, a better understanding will result.

When all the costs of a gas business were set down, it was found that some affected only the user. Among these costs the more important are meter reading, keeping customers' accounts, mailing monthly bills, and the cost of setting and adjusting appliances. The total of all such expenses is known as Customer Expense. It takes no longer to index a large meter than a small meter, and the time of entering the readings on the ledgers is the same. It may cost a great deal more effort to sell a low priced appliance to a person of moderate means than a

large, expensive appliance to a manufacturer. The result is that the Customer Expense can be fairly divided by the total number of customers to give the amount to be charged to each customer. To cite an example,—consider that for a company of 25,000 meters, the customer expense is $300,000 annually, then the monthly customer cost is

$$\frac{\$300{,}000}{25{,}000} = \$12.00 \text{ per year or } \$1.00 \text{ per month.}$$

Another type of costs or expense was found to revolve about the cost of the gas manufacturing plant, holders and distribution system. How big a plant should be built? What size trunk lines are needed? What size street main should be installed? How much holder capacity must be provided? These are some of the questions that must be answered before a pencil touches paper or a shovel touches ground.

Time of Demand Varies

There will always be some one time during which each customer will use more gas than at any other time. It is improbable that this time of maximum use or "demand" will coincide for every customer. Consequently the smallest plant which can satisfactorily handle all the customers will have a less output than the total of the demand of all the customers. The same is true for mains, trunk lines, etc. On some one day or perhaps on any day within a certain period, the full capacity of the plant and distribution system will be used. In the Northern cities this may occur on any day in December, January or February, and this coincident with the extremely cold days. On this extremely cold day, the plant with 25,000 meters may expect a load of 5,000,000 cu. ft. The annual cost of such a plant and distribution system may be about $150,000. The customer wants gas on this day and by figuratively hiring a portion of the system is assured of a sufficient gas supply for his needs. If, for example, a customer wants 10,000 cu. ft. on this day, he actually hires 1/500 of this plant by paying this share of the annual cost of $150,000 or $25 monthly.

$$\frac{\$150{,}000}{500} = \$300 \text{ per year.}$$

Similarly, a customer using 1,000 cu. ft. on the maximum day would pay $2.50 monthly demand charge, and one who used no gas during this period would make no demand payment. His use of gas is only during those periods when the plant has a surplus. The second type of costs consists of leasing a portion of the plant in which to make as much gas as the customer needs on the day when the plant is at its peak.

Gas Making Costs

The third allocation of costs is for making gas. All costs of labor, fuel and other material used in the production of gas are included in these costs. The expenses in this group exist only when gas is being made; they start when gas making starts and cease when production of gas stops. These costs are called the Commodity Cost and are determined as the charge to be made per 100 or 1,000 cu.ft. by dividing the total gas making expense by the amount of gas made. Using this system of 25,000 meters again as an example we can assume an annual gas send out of 1,000,000,000 cu. ft. at a manufacturing cost of $500,000. The unit cost per 1,000 cu. ft. is therefore 50 cents.

$$\frac{\$500{,}000}{1{,}000{,}000{,}000} \times 1{,}000 = 50 \text{ cents}$$

The average domestic customer of this company has a demand of 200 cu. ft. and an annual consumption of 40,000 cu. ft. The gas bill would be

Charge	Monthly	Annually
Customer	$1.00	$12.00
Demand (Fixed) 200 cu. ft. at $30 per M. cu. ft./yr.	.50	6.00
Commodity—3300 cu. ft. monthly at 50 cents per M.	1.65	20.00
	$3.15	$38.00

An average cost of $.95 per M. cu. ft.

With a cost set up of such amounts, the probable block rate would be such that the average domestic customer would pay about $1,20 per M. cu. ft. in order to permit of a sliding scale for the larger users.

The "scientific rate" is gradually gaining in adoption with the constant education of the customer in the underlying costs of operating a gas utility. As of January 1, 1926, there were 16 companies using the 3 part rate. A year later this number had increased to 59 and two years later, January 1, 1928, to 77.

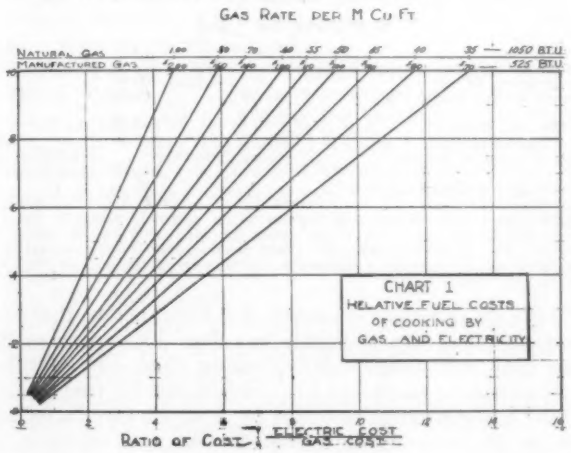
Regardless of the type of rate schedule, it is probably safe to say that the most usual domestic rate for 525 B. T. U. manufactured gas is $1.00 per M. cu. ft. and 60 cents for 1050 B. T. U. natural gas. For our purposes, these rates will be considered as typical.

Comparative Costs of Fuel for Domestic Purposes

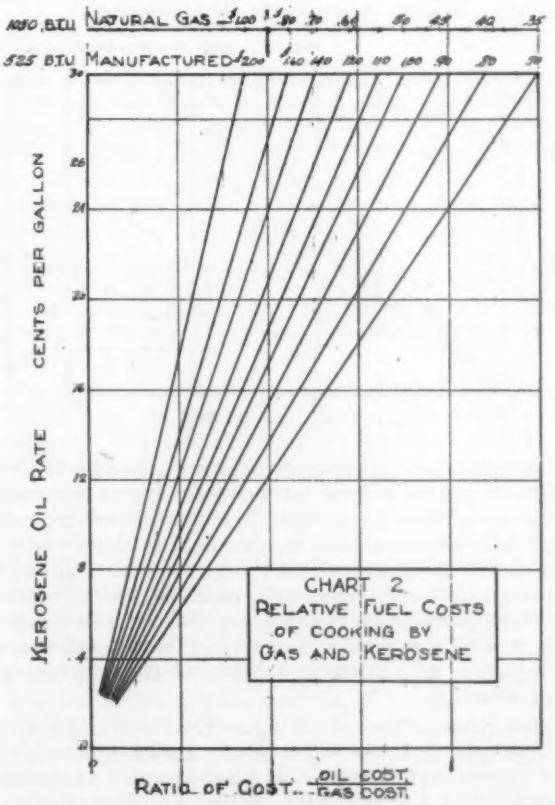
Many records are available of actual cooking tests between fuels to determine as far as possible the costs for normal kitchen operation. The results are all of the same order, differing only in magnitude. These vary from a B. T. U. of electricity being equivalent to 1.35 B.T.U. to 2.02 B.T.U. of gas. Of these various comparisons, probably the most reliable are those conducted by a gas company laboratory which gave a ratio of 1 to 1.65. This series covered the preparation of meals for a family of five, using coal oil, electricity and gas. The menus were varied to include light, medium and heavy meals. Similar cuts and weights of food were prepared in the same utensils, except where the construction of the appliance required a special form of utensil. It is important to note that regardless of menu, whether it was a light breakfast or heavy dinner, the conversion ratio was exactly the same. The comparison between gas and kerosene oil likewise had a similar agreement of heat requirement and it was found that 1 B.T.U. of gas was equivalent in cooking effect to 1.42 B.T.U. of oil. The direct comparison of gas to coal is difficult to establish. A coal range not only is used for cooking, but much heat goes to the kitchen, eliminating the need for additional heating. However, it can be safely said that 1 B.T.U. of gas is equivalent to 10 B.T.U. of coal for cooking use.

Charts 1, 2 and 3 show a comparison of gas and electricity, gas and oil, and gas and coal for cooking, using various rates found in practice. The costs for both manufactured gas and natural gas are plotted on curves against the cost of the competitive fuel. The result is the ratio of cost between the fuels. As an example, there is gas available at $1.00 per M. cu. ft. with oil at 18 cents per gallon. To determine the ratio of cost, the 18 cent oil line is followed until it intersects the $1.00 gas line. A vertical is dropped until it intersects the cost ratio scale at $1.05 or oil is 5% more expensive at those rates than gas for fuel only.

Again, electricity is being sold at 3 cents per KWH. What price natural gas will cost ⅓ that of electricity for cooking? Gas at ⅓ the electric cost is the same as saying electricity at 3 times the gas cost. Therefore, erect a vertical on the Ratio of Cost Scale at 3, draw a horizontal from the electric rate scale at 3 cents. Where the two intersect is the gas cost. Using the figures for natural gas, the cost is approximately $1.85.

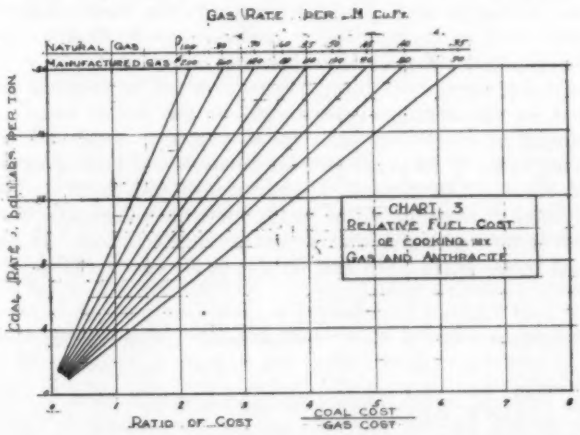


Other examples will present themselves from time to time. From the charts and examples, no difficulty should be experienced in arriving at the correct result.


1050 BTU NATURAL GAS
525 BTU MANUFACTURED
KEROSENE OIL RATE CENTS PER GALLON
CHART 2
RELATIVE FUEL COSTS OF COOKING BY GAS AND KEROSENE
RATIO OF COST
OIL COST / GAS COST

A more involved comparison is necessary for house heating and water heating costs. The fuel cost is the most important cost item, but there are many other items seriously entering into overall costs. These cannot be overlooked. Coal and gas boilers have longer life than an oil fired boiler, the investment is also lower. Oil and gas boilers eliminate the labor or cost of labor for coal firing. On the other hand, coal as a fuel is cheaper than oil or gas. The fuel cost comparison is given in Charts 4 and 5, and must be further modified to include other costs. The usual fuel prices for house heating fuels is also quite different from those for cooking purposes. Gas costs about 80 cents per M. cu. ft. Oil averages 9 cents per gallon, with hard coal about $14.50 per ton, in sizes and qualities suitable for heating use.

To be more specific in this comparison it is usual to find coal boilers in good serviceable condition after 30 years usage and many are constantly encountered with 50 years of heating duty. The constant fire in these boilers prevents cold spots which suffer from great expansion when a fire is suddenly pushed. This condition of very high rate of combustion and sudden cutting off of fuel is one of the reasons for the much shorter life of boilers in which oil is used for heating. It has already been pointed out that oil particles impinge on the surfaces of boiler and furnace walls, causing a metal pit burning in close contact with the iron. Although gas for house heating has been used for many years, the specially designed gas boilers have been marketed for only about 20 years. Practically without exception the original boilers are still in service at no loss in efficiency or serviceability.


GAS RATE PER M CU FT
NATURAL GAS
MANUFACTURED GAS
COAL RATE # DOLLARS PER TON
CHART 3
RELATIVE FUEL COST OF COOKING BY GAS AND ANTHRACITE
RATIO OF COST
COAL COST / GAS COST

One case has recently come to light of a gas steam boiler used for indirect hot water supply which had the equivalent of over 47 years of house heating service. After a wire brushing and replacement of push nipples damaged in tearing down this boiler, it was reset for building heating for a good sized office building. Some of the important reasons for this long life are the facts that gas boilers are designed with sufficient heating surface for the load to be handled that the rate of gas combustion is moderate, permitting the metallic sections to heat gradually without overheating to the point of damage to the boiler and that the flame never impinges on any surface.

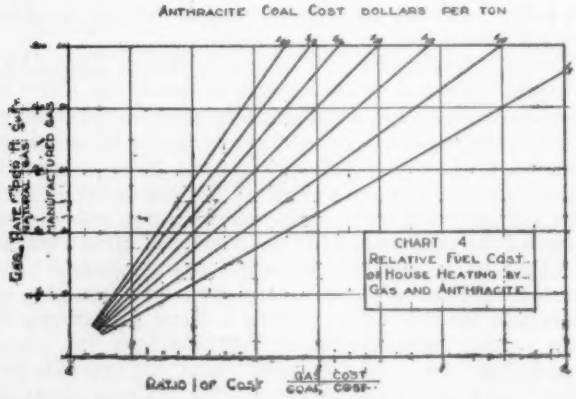
For these reasons the life of coal and gas boilers is set conservatively at 30 years and for boilers fired by oil at 20 years. The replacements of mechanical parts of oil burners and pumps, however, limits the life of burners to from 7 to 10 years.

The investment in a coal boiler is less than that in a gas boiler or in a boiler plus the oil burner and equipment. Excluding the costs of erection of the boilers which are similar, the investment in thermostatically controlled boilers for coal, oil and gas for a 7 room, 1 bath, detached house are about as given below.

Coal	$375.00
Oil	$800.00 to $1,200.00
Gas	$600.00

The spread in the cost of the oil equipped boiler is

caused by the difference in size of tanks installed The oil used in a normal winter in a city with a climate like New York City for such a house is roughly 2,250 gals. During December, January and February, 400 to 450 gallons should be used each month in a normal winter.


ANTHRACITE COAL COST DOLLARS PER TON
CHART 4
RELATIVE FUEL COST OF HOUSE HEATING BY GAS AND ANTHRACITE
RATIO OF COST
GAS COST / COAL COST

Wisest economy would choose at least a 500 gallon primary tank, although in many cases only a 200 gallon size would be set. The difference in the costs of these tanks and their installation makes a great deal of the difference in the cost of oil burning equipment. In summarizing these cost comparisons it must be pointed out that in the average case a coal or gas boiler must be bought at most only once in 30 years, a boiler for oil firing once in 20 years and oil burners and pumps every 10 years. The actual expenditure should therefore be divided by the number of years for which the equipment will last to give the yearly cost or depreciation. If the coal boiler costs $375 and its life is 30 years, the yearly cost of this boiler is $\frac{\$375}{30}$ or $12.50. In the same way the interest which the money spent would earn should be added as the interest on the investment. Again using the coal boiler as the example, 6% of $375 is $22.50.

Miscellaneous Coal Furnace Charges

To the credit of the oil burner is the absence of labor of supervision which is, however, realized to the fullest extent in the gas boiler. Coal boilers require much labor. Firing the furnace, removing ash and cleaning the furnace room are among the outstanding duties found in tending coal furnaces. Professional furnace tenders charge from $15 to $30 monthly in the larger cities and adjacent suburban districts. For a 7-month heating season the labor cost for a furnace tender varies from $100 to $200 when burning coal. When furnaces are tended by a member of the family, the time spent, clothes spoiled and general inconvenience are surely worth at least $100 even though no money is actually spent. This charge is as just as the cost of gas for pilot and electricity for oil pumps and air blowers when using oil burners.

These costs, therefore, are logical to add to the bare fuel costs. As a portrayal of the cost of househeating fuels the attached table supplements the curves of comparative fuel costs and is based on results for good operation. A house requiring 425 sq. ft. of steam radiation (an average 7 room and 1 bath house) is used for the comparison.

Investment Costs

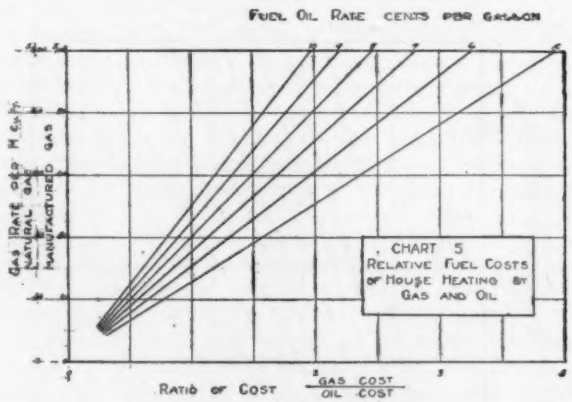
	Coal	Oil	Gas
Boiler and Insulation	$260.00	$260.00	$480.00
Thermostatic Control	115.00	Included in burner	115.00
Burner, Tank, Pumps		$900.00	
Total	$375.00	$1160.00	$595.00

Yearly Operating Costs (16 Hours 70° F. 8 Hours 55° F.)

	Coal	Oil	Gas
Depreciation Boiler	(30 yrs.) $12.50	(20 yrs.) $23.00	(30 yrs.) 19.83
Depreciation Burner	..	(10 yrs.) 70.00	..
Interest on Investment-6%	22.50	69.60	35.70
Labor	100.00	..	..
Service and Repairs*	..	40.00	..
Total Excepting Fuel	135.00	202.60	55.53
Fuel—13 tons at $14.50	188.50	2250 gal at 9c 202.50	446,000 at 80c 356.80
Electric Motor and Gas Pilot	..	42.00	..
Total Operating Costs	$323.50	$447.10	$412.33

* The charge for service and repairs is on a yearly basis by the oil burner distributor, the value of $40 being the usual cost for all makes of burners. The Gas Company as a rule provide free service except for repairs caused by customer's negligence and service on the part of the coal man is very rare.

With all the costs included, the totals show that for the rates cited, gas is slightly less than 30% more costly than coal and roughly 8% cheaper than oil. Similar analysis can be made for any combination of fuel prices. Where a preferential rate is in force which gives a reduction on all gas used, the actual domestic consumption at prevailing rates should be added in for coal or oil house heating and the cost of such gas under the preferential rate added to the cost of fuel when gas heats the house. It will usually be found that the comparison makes the difference in costs much lower than imagined.

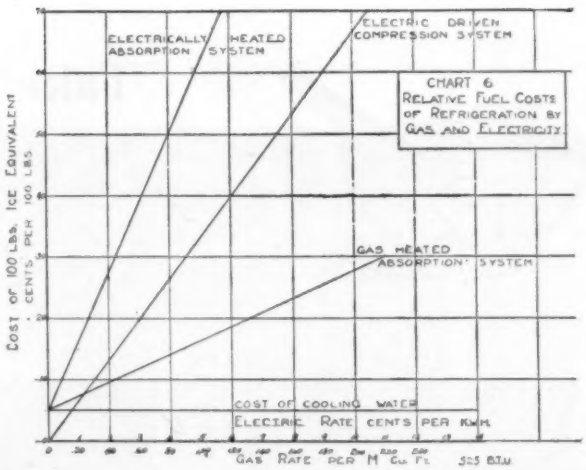


The labor saving, close temperature control and cleanliness of gas as a fuel for domestic hot water supply make gas almost non-competitive for this service. The chief handicap met with in this field is the prevalence with which the customer overlooks the never failing hot water supply, never previously available, and remembers the small increase in monthly gas bill. It is always the case that a far greater use of hot water follows the introduction of automatic service which also increases the fuel costs.

The introduction of the gas fired refrigerator has brought gas into new fields and in competition with ice and electric refrigeration. A good example of selling is evidenced in refrigeration, for the use of cooling was very limited. Mechanical refrigeration for domestic purposes is doing more than supplanting ice, as it is opening up many new outlets. Many of these are accepting ice as the refrigerant because of the lower initial investment. The ice men are also making great efforts to retain and broaden their market with the result that the combined publicity has resulted in great increases for

both natural and mechanical refrigeration. The comparative costs for this service are greatly in favor of gas which added to the other advantages of silence, automatic operation, rapid refrigeration and spotlessness will soon make gas non-competitive for this use wherever gas is available. The use of water for cooling purposes is almost negligible and in addition makes it possible to install these refrigerators where air cooling of electric refrigerators is impossible, giving a space saving feature not found in competitive mechanical refrigeration, However, for completeness, a chart based on an analysis by Dr. Hainsworth in Refrigerating Engineering, February, 1927, is included. This chart has been greatly simplified by assuming a cost of 5 cents per 100 lb. of ice which is at the rate of over $3.00 per 1,000 cu. ft. The costs per 100 lbs. of ice are obtained by following the vertical line from the gas or electric rate to the proper curve and then following the horizontal to the left hand scale giving directly the cost per 100 lbs. of ice. It will be found that invariably the cost of gas refrigeration is less than half that of ice.

In conclusion, it can be said safely that as far as costs of operation are concerned, gas has and will continue to have no competition from other fuels for cooking and refrigeration. For hot water supply, the automatic unfailing supply overcomes the slight additional cost to


ELECTRICALLY HEATED ABSORPTION SYSTEM
ELECTRIC DRIVEN COMPRESSION SYSTEM
CHART 6
RELATIVE FUEL COSTS OF REFRIGERATION BY GAS AND ELECTRICITY
GAS HEATED ABSORPTION SYSTEM
COST OF COOLING WATER
ELECTRIC RATE CENTS PER K.W.H.
GAS RATE PER M Cu. Ft. 525 B.T.U.
COST OF 100 LBS. ICE EQUIVALENT CENTS PER 100 LBS.

such an extent that as many gas hot water heaters are sold every year as gas ranges. The cost of gas for house heating is less than oil under usual rates and only slightly more expensive than coal considering all costs. The saving of one complete redecoration of the home in 5 years would wipe out that difference in cost. As a domestic fuel gas has and can have no legitimate rival except where very unusual price relations occur.

Government's New Plant at Amarillo Cuts Helium Costs in Half

The Amarillo, Texas, Helium Plant has again made new records in cost of production and purity of the product, according to the United States Bureau of Mines, Department of Commerce, which designed, built, and operates the plant. During September, the plant produced 847,840 cubic feet of the non-flammable gas used in airships. The amount of the element, helium, contained in the product is 828,700 cubic feet, or, in other words, the product has an average purity of 97.7 per cent. Engineers of the Bureau of Mines refer to the actual amount of helium in the product as the "contained helium."

The operating costs for the month were $14,609.31 or $17.63 per thousand cubic feet of contained helium produced. These operating costs represent the current expenditures made from the United States Treasury to operate and maintain the plant and gas field and to cover supervisory expenses in Washington. There is a return to the Treasury from the month's operation of $3,000.79 from the sale of residue natural gas from the plant. Deducting this return from the gross expenditures of $14,609.31 gives a net expenditure by the Government of $11,608.52 or only $14.01 per thousand cubic feet of contained helium produced.

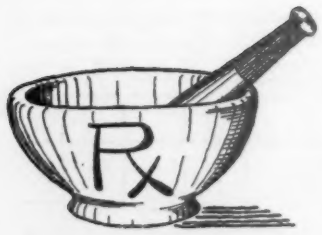
The September report confirms the statements made by the Bureau of Mines before the Amarillo plant was built, to the effect that its operating costs would be much lower than those which prevailed at the Government's Fort Worth helium plant. The Fort Worth plant formerly supplied helium used by the Army and Navy but was closed in January, 1929, because of exhaustion of the gas field on which it depended for its helium-bearing natural gas. During the six months ending in December, 1925, when the Fort Worth plant was producing at the rate of 830,000 cubic feet of helium per month, or approximately the same rate as the production from the Amarillo plant in September, 1929, the average operating costs were about $28,800 per month, or $34.70 per thousand cubic feet of contained helium produced.

Although the average purity of 97.7 per cent shown by the September report is lower than purities that will be attained after the Amarillo plant is more completely adjusted, it is a marked improvement over the purity of the helium that was produced at Fort Worth. The average purity of the Fort Worth product was 94.6 per cent in 1926, 95.0 per cent in 1927 and 95.4 per cent in 1928. The highest monthly average purity recorded at the Fort Worth plant was 96.6 per cent in December, 1928.

Coke-Oven Operators Complimented

The effectiveness with which the pollution of Ohio River water supplies by phenol wastes has been brought under a large measure of control within the comparatively short period of time intervening since the year 1925, constitutes one of the brightest pages in recent sanitary history. Accomplished, as it has been, without any coercive legislation, but through cooperative effort by the Federal and State Governments and the industries concerned, it augurs well for the future solution of some of the larger problems of stream pollution now confronting the Nation. Although pollution of the Ohio River system by phenol wastes has not been completely eliminated, as evidenced by occasional "spills" which have occurred during the past year or two, it has been curbed to an extent such as to justify the expectation that in the near future it will cease to be a major problem along this important waterway. A generous measure of credit is due to those whose joint efforts have brought about this fortunate result.

—H. W. Streeter, U. S. Public HealthService.



Take The Trouble to Tell Them

By William H. Matlack

A PENCIL pusher produces figures to prove that selling to the masses is not productive. Eighty per cent of our effort is expended in evolving an effervescent for the whole populace while sales that are profitable are made to but twenty per cent, and they placard them the plutocratic.—Bunk!

Papa's pampered boy, with a pregnant purse and a desire to "go into trade" may get away with a style of selling that promotes pretties to a clientelé. Gas appliance merchants manoeuvering for markets with ready money, to increase gas sales per meter will do well to play-up to the market with a payday.

Incinerator, range, laundry dryer, radiant-fire, water heater and refrigerator buyers are not so strong for high-hats.

"The higher the hat the harder to sell —let 'em alone and they will buy—expend your efforts in acquainting those on the way up, if you want a fat pay check," said a smart gas appliance salesman. It just is not in the cards to pay the proverbial profit on preferred or common and patronize only the plutocratic. However it is conceded that the patrician market is profitable for those who can afford to cater to the exclusive, the inner circle.

Any man who knows his merchandising has at some time during his career reached that natural and laudable position where he wished to sell to an exclusive, moneyed market; to the swank—but—

Following Objective

So we might go on expounding on markets for all we have to sell. We might go in for statistics, a prophesy or join a howling pack of Jeremiahs who claim, "that it can't be done." But what's the use of exploiting or exploding anyone's pet scheme or selfish plan. Let's meet general conditions and give folks what they want, after teaching them that they want it, through proper promotion, advertising and salesmanship. Let's stick to our objective.

Our prime and pure object, if you must, is to sell bigger and better uses of gas to home managers by educating them to the advantages of owning and using the new good looking gas consuming appliances to aid them to more efficiently manage the home and to beautify it.

This job is a sales job commended to the commercial manager in every community in which gas is distributed. Yet, if it is to be wholly and successfully

William H. Matlack

sold, these commercial men must be vested with sufficient authority to cope with all competition, and be so constituted that they may assume true leadership or delegate it to assistants with sufficient initiative to meet and speedily attain our objective; to make each meter installation a profitable one, both to the customer and the company.

The problems incident to fully equipping all homes on our distribution systems with a complete line of gas consuming appliances are local ones and will of necessity have to be subjected to local treatment by a local merchandise leader.

The public may be "brothers under the skin" in the same clime, under the same conditions or when purchasing a commodity at the same rate, but it don't just happen that way nationally, therefore our problems must be subjected to said local treatment.

A diagnosis may divulge anything. Amputation may be advisable or a revision of merchandising authority may be needed. Business Doctors discover strange maladies where selling is in the dolefuls. Sometimes such scientific scrutiny discovers a lack of sympathy between selling and something else. Again an autopsy reveals a general lethargy and no desire to meet general conditions or supply local wants so necessary to successful selling of home appliances, and so it goes.

If we are going to sell the classes, the masses, or the newly-weds gas ranges, water heaters, radiant-fires, laundry dryers, wood and coal-fires, weather-makers, washing machines with gas heaters, garage and house heating equipment or incinerators we must study local wants and do our utmost to supply them, to meet general local conditions.

Meet general local conditions, give folks what they want, flaunt your gas appliances of beauty, utility and modern design in front of the masses. Find something "new," useful and beautiful in your merchandise to talk about and it will be taken on by the public,—folks who have pay-days on the first and fifteenth.

A Conceded Fact

Gas appliance merchandisers concede the fact that it is not the man with the insignificant income, or he whose income is incalculable, but the fellow with payday on the first and fifteenth, with ready money, who buys the modern gas range, water heater or refrigerator "run with gas." It is the fellow whose family anxiously awaits said dates in their desire to keep up with the Joneses. These folks follow the features, the fashions, the fads and have hunches that science is correct, that the infra-red and ultra-violet rays produced by the radiant gas fire are essential to their health and the happiness of their homes; that is, if someone will suggest such a thing, *take the trouble to tell them about it.*

The self-sufficient have to be sold and those in near-want cannot buy. Helps that harmonize with the color scheme of the kitchen will be sold to the spenders, the folks blessed with a regular pay-day and a knowledge of the family budget and the plan that enables them to purchase and pay for their wants little by little. These are the folks who comprise the portion that gets what it wants, "the public," the people who propagate the trends of the times. They are the families that put-up for gas-fired weather-makers and what-nots, the folks the high-pressure boys speak of as "potential prospects" for what have you. Then there is the other side of this merry-go-'round of merchandising, for the men of our ancient and honorable industry.

Some twenty thousand uses for gas needs go modern. For no matter what may be said about the jolt gas has given

the keeper of the kilowatt and the increasing inroads the carefree fuel is making in industry the sales scrimmage ahead will put a strain on sales-strategy—and we don't mean perhaps. Sedentary selling is passe.

The new business manager, or what-you-call-him, with eighty thousand miles of new transmission-distribution lines from Amarillo to Atlanta and elsewhere must step on the gas, must marshall his men and materials like a master in this "race for supremacy" of the fuel market "which has just begun."

Industry hears and harkens the cry for the new. Paint, pottery, petrolum, printing and pajama manufacturers, glass and brass molders, clay products and cake-makers, laundries and line-o-type machines, varnish and vegetable-soup makers, ship builders, steel makers and smelters all use gas the carefree fuel along with the home manager and others to meet general conditions pertaining to the day's work. Then there is house-heating, the carefree way for the newly-weds (and others who hate dirt, labor and grime) who are seeking the moderné and who are open-minded and receptive to new ideas.

John Newly-wed will be the staid family head ten years hence and be interested in growing an income,—today he is the spender, the man who wants your wares. Just starting to equip a unit of the world's greatest industry he is very desirous of doing a good job. There's the "little girl" to whom time is an equation. To her the multiplication of minutes means much. She has so many things to do and so much to learn in so short a time. She must have a correctly appointed kitchen, with a beautiful gas range and refrigerator, there must be an abundant supply of hot water, garbage must be disposed of in the modern manner, then there's the laundry problem, the health giving gas fire for the hearth. And she will have these things—if some alert gas appliance salesman exposes them to her view, and *takes the trouble to tell her about them.*

An Inexpensive Window Display

S. C. Rieser, Display Manager of the Laclede Gas Light Company, St. Louis, recently staged a new one; "A Silent Broadcast" that went over big with the Spirits of St. Louis. When Mr. Rieser decorates a window he does it "different" and in a manner that makes folks stop, look and loosen-up.

The display shown herewith well illustrates what may be done with a single gas range. It will be noted that simplicity is the key-note of this display and men who have but little material to work with will observe that very little was spent for props, or other decorative material.

Friday — Thirteenth

The gas man who has not conducted a "Friday the 13th Sale" has one more opportunity to cash in on this one day special sale on the thirteenth of next month, Friday, December the thirteenth.

This sale, while an event of but one day's duration, deserves the same careful planning as though it were for a two weeks or a full month's duration.

In this respect thirteen may be capitalized at the outset by building a thirteen point platform. This platform should have the following points or planks;

1—Organize to attain a definite number of sales.

2—Educate all employees carefully in regard to the merchandise to be featured and the plan of sale, terms, etc.

3—Plan all work by groups to co-relate in attaining the desired number of sales.

4—Plan prize competition to include all who participate in the activity.

5—Adhere closely to the program laid out, once details are decided upon.

6—Plan your activity carefully and make no revisions once it has been announced.

7—Hold store or other public demonstration of the merchandise on the day of the sale.

8—Install attractive window display and display the merchandise on the sales floor.

9—Hold one or two sales meetings; one at least on the morning the sale opens in order that every one participating may understand all details and his or her part in the acticity.

10—Have telephone reports of sales and a check-up hourly during the day.

11—Plan to "cover the live prospects" closely, either by calling in person or by 'phone.

12—Pay employees for all sales closed.

13—Reward good work with cash bonuses.

One sales manager who made an outstanding success of a "Friday the 13th Sale" used a plan very much along the lines of the one outlined above. His first work was in deciding upon the range (his was a range sale) that he wished to use during the sale. This done he had one taken into his office where he made a complete catalog of its construction, sales features, etc., etc. Then he called in his salesmen and painstakingly went over these points with them together with his plans for advertising the sale, the price offer and terms. Together with this he supplied the salesmen with a sheet showing the possible earnings, commissions and bonuses to be made. This was all done a week before the day of the sale. The day before the sale opened the whole plan was again reviewed and each salesman was asked to commit himself as to the number of ranges he expected to sell next day. The result of this careful planning made the sale a huge success.

Another successful "Friday the 13th Sale" was held several years ago by a

North Carolina gas company. This company featured a well known continuous flow gas water heater and depended entirely upon window display and newspaper advertising to put the sale over.

Other gas companies have used bill stockers, inserts and door-bell hangers to good advantage.

As we view it a one day sale of any description to be successful must use a goodly amount of showmanship, and it is well to take advantage of every known type of advertising, such as mentioned in the foregoing and such added attractions as store front banners, truck banners and news stories whenever possible.

One way to determine just what to do to advertise such a sale is first to determine an attainable quota and to set up a definite advertising allowance per unit based on this quota. This done it is but a small matter to decide upon the advertising aids to employ. We would say that newspaper advertising be given first consideration and that store and window display follow with bill stickers, inserts, truck banners, etc., following.

So many plans have been developed around Friday the 13th that it would be very hard to decide just which one of them had the greatest power of persuasion; 13 cents down, 13 months to pay, a premium to the 13th purchaser, 13% discount and many others have been used.

We well remember that on the 13th of July, 1923, the Gastonia and Suburban Gas Company (North Carolina) staged a "Friday the 13th Sale" and their advertisement said in effect, that "the first purchaser of the Famous Ruud water heater would be given an additional discount above the special sale allowance of $13.00."

This added allowance was cashed in in an unexpected manner by a local minion of the law, who awakened the sales force at 5:13 a. m. on the day of the sale and after hustling "him" down town in the direction of the "barracks," led him over to the gas company's store and announced that the first customer was at hand and was ready to execute a contract for a Rudd and secure the extra $13 allowance, together with the $13 discount as advertised.

The Appetizing Season

November is here again. It's time to talk to folks about making the living room more livable, by enlivening the fireplace with a radiant, gas-coal or wood-fire. It is time to talk to folks about new ranges, gas clothes dryers and incinerators.

With pumpkin pies, fruit cakes, and turkeys to bake the home manager is very receptive at this season to the suggestion that she trade in her old gas range as a part payment on a new and modern one.

November finds the home manager more receptive to ideas that will add to the efficiency, convenience or beauty of the home. It is a good month to sell the full line of gas appliances.

A Good Prescription

To make them stop, look and loosen is an art especially at holiday time when most everyone goes a-window-shopping. If your inventiveness has been dulled try the following prescription for provoking interest in the appliances you have on display. Play a colored spot or revolving light on the merchandise in your windows or on the sales floor of your store. Near the display of radiant gas heaters construct a railroad crossing post with arms lettered, "DANGER—A cold room." Play a red spot light on it and a white spot light on a display card set alongside the heaters lettered "B—To avoid colds from chilly rooms install a radiant gas fire. Now only 95 cents down."

Garage Heater Business Is Profitable

With Jack Frost paying his nightly visits and old man Freezing Weather at hand, advertising of garage heaters should be helpful in the sale of that load building appliance, where rate structures are right. Every motorist is confronted with the problem of protecting his car from freeze-up during the next four months and will welcome any appliance that will enable him to obviate this troublesome worry.

WHEN you start your stiff motor in the morning, the bearings which are shrunken with cold, grip the shafts like a vice. The oil, being thick cannot lubricate, hence the bearings are slowly but surely ruined.

The tremendous overload is hard on the starting mechanism and the frigid half-charged batteries. The gasolene vapor condenses in the icy cylinders, drains into the crankcase, killing the oil. Thus the cylinders become scored, carbon deposits accumulate, the motor becomes inefficient, loses power, wastes gasolene and oil, boils off alcohol and then that expensive motor freeze-up may come.

These are but a small part of the havoc of cold garage housing. To warm your garage with a Scientific Safety Garage Heater, automatically controlled, costs but a fraction of the damage prevented, preserves the smoothness and power of your motor, gives you comfort and peace of mind

May we lay all the facts before you?

(Advertiser's Name Here)

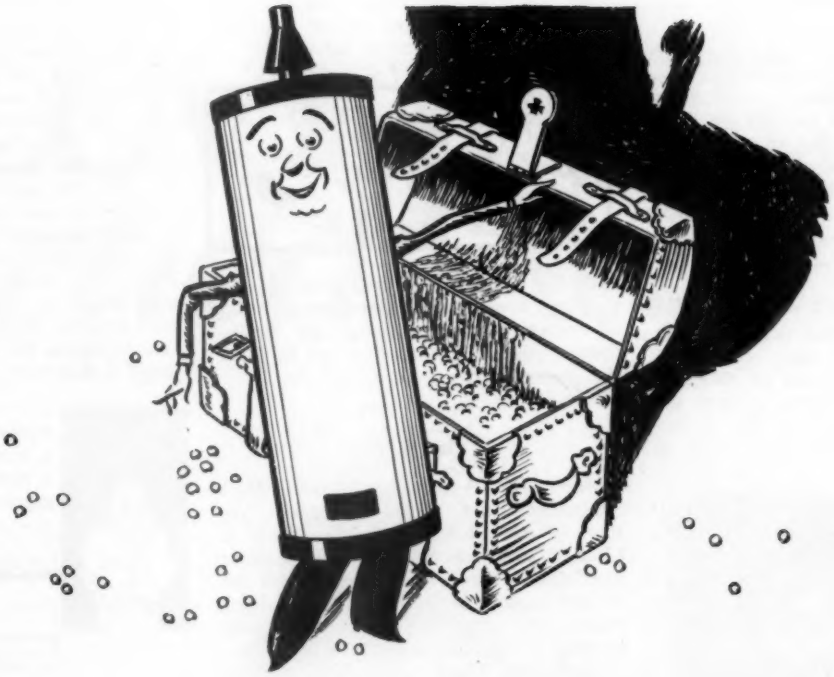
We are reproducing a garage heater advertisement on this page that will get attention and which will provoke other ideas for you.

Verbum Sap

What H. T. East, has had to say in recent issues of the AMERICAN GAS JOURNAL is well worth the attention and study of every merchandising gas man. Mr. East's articles point out some of the reasons for the lag in store sales in a number of ways. If you doubt the wisdom of a study of Mr. East's findings re-read "The New Customer" and check-up on him at your own service counter. See if now and then; "Bewildered and doubting, Mr. New Customer passes out (of your store without a turn of the head to examine the merchandise you are displaying for sale and which he needs and wants and will have) to await developments."

Many thousands of dollars escape us in the pockets of those "bewildered and doubting' 'new customers each year accord to Mr. East; "Statistics show that in

(*Continued on page 68*)



Don't put your water heater business in camphor for the winter ~ ~ ~

Not so many years ago, folks locked the automobile in the stable all winter and waited for the chirp of the robin before hitting the highways in Spring. Now they're sold and used all the year around . . . Until recently the big soup-makers let summer slide with nary a bowl of mock-turtle on the menu. Now they advertise soup and sell it twelve months a year. Once upon a time the Saturday Night Bath was a national institution. Now the *every-day* tub is Exhibit A among Social Requirements.

. . . . And to meet modern conditions, gas water heaters have been taken out of the winter camphor and put in the show window for all to see. It has been proved that they can be sold profitably twelve months in the year.

The Welsbach Hotzone water heater has helped to bring this about. It is a remarkable heater at a remarkable price, finely finished and efficient in appearance, sturdily made and reliable in operation. The name Welsbach is its guarantee of structural soundness.

If you haven't yet tried the Hotzone on a twelve months' selling basis, let us help you get started. The additional load on the lines makes it doubly profitable. Welsbach Co., Gloucester City, N. J.

Welsbach **HOTZONE**

SELF-ACTING GAS WATER HEATER

Ready for Service

Member American Gas Associati

Saleshots

(*Continued from page 66*)

the United States gas companies each year serve for the first time well over one-half million new customers, men and women who never before enjoyed the benefits of the service." They all need, want and will purchase gas ranges, water heaters, refrigerators, or other gas appliances —if we can make the matter of getting gas a less painful task.

A Belle Who Isn't so "Dumb"

Creating advertising that talks is the desire of all advertising men. Some of them do it well and some of them do it in a manner that likens it unto the spoiled child or the one that is too fresh and talks back to them. But, it

takes P. W. Hopkins to create advertising that gets talked to. Witness Philip Hilk of Louis Hilk and Sons Company, Homestead, Pa., talking to Miss Roper. From the look upon the young lady's face we suspect that they are going to make the sale of ranges a year 'round activity—as it should be, if we are to hold the worth while cooking load.

Never Drive 'Em

"Never," said the old timer, "intimate that the woman in the home does not know what she wants. It's all right for you to think that she does not and then try to sell 'er, through suggestion, an article that she thought she did not want but, be careful about voicing your thoughts on what she wants. At one time I heard a new salesmanager deliver a lecture on the subject of selling 'em what you have as a special—'they do not know what they want,' he said as he instructed his new gang.

"Also, I remember what one of the gang said about telling folks that they did not know what they wanted after trying out the idea a few times. I also remember what one irate prospective customer had to say about what she wanted after being approached by one of these men.

"Folks do like to be led, never driven, and gas appliance salesmen who are at all successful and truly represent the industry will lead rather than try to drive the customer over the dotted line."

A Good Tip

Newspaper Advertising, Direct Mail Advertising and Window Material are three of the sub-heads used by James B. Clow & Sons in their new advertising portfolio. Particularly interesting is the subject matter under the first sub-head which tells what newspaper advertising is, what it does and suggests ways to use it profitably. The portfolio is of value to anyone who will take the time to sit down and read and study it. No doubt a copy may be secured by addressing R. C. Meima of the company's advertising department.

Here's How

Making Merchants out of Master Plumbers seems to be the job that the Consolidated Gas Company has taken over in New York and from the advertisements we have seen directed at this erstwhile elusive lot they were going to make a good job of it.

As most gas men know plumber co-operative plans produced in the days of not long ago did not go over. The sole reason for this may be attributed to the fact that the gas man did not *study the needs and conditions of the plumbing business.* Hence the plan proposed was not one that would result in *a mutual benefit.* There was not enough YOU in the old style plans for the plumber to want to come into the picture. The Consolidated's plan is chuck full of "you" and as we judge it that will put it over.

CAN YOU AFFORD
A NEW AUTOMOBILE
A NEW HOUSE
A TRIP TO EUROPE
?
• MODERN •
GAS APPLIANCES
pay for luxuries
with this new
Merchandising Plan
THE "Help-You-Sell" plan of your Gas Company is for the benefit of the plumbing and heating trades of New York City.
We studied your needs and the conditions of your business. The result is a mutual benefit arrangement that gives you the maximum amount of help in expanding your profits.
WE BELIEVE
Come into the picture! Join the scores of other plumbers who are profiting through this opportunity. Our representative will gladly discuss all details with you at your convenience.
CONSOLIDATED GAS COMPANY
OF NEW YORK

The New Home Service Department

Some Suggestions for Its Establishment and Operation

Luella M. Fisher and Grace Rebman Preston

Eriez Stove and Manufacturing Co.

POINTS TO COVER ON INSPECTION CALL

(*Continued from October Issue*)

1. *Inspect piping, connections, loose parts, screws, etc.*
2. *If heat control is of that type, test with cold check method, setting minimum flame (by-pass) and oven pilot light.*
3. *Adjust maximum oven flame and place oven thermometer in oven on rack near center of oven.*
4. *Set dial at 350 degrees for making hot check, and wait ten minutes after maximum flame has cut to minimum before opening oven door. Read thermometer quickly. In certain types of insulated ranges it will be necessary to wait 30 minutes before taking the reading.*
5. *While oven is heating adjust top burners, teaching housewife proper blaze to obtain best results. Clear blue flame with distinct cone, coming just to tip of grates. Adjust lighter*

Illustration: When sleeping in room with windows closed, person feels groggy, no pep, no life, tired. Same condition in gas flame when no air. When sleeping in room with plenty of air, person feels peppy and full of life. Same when gas

(*Continued on page 70*)

GLOVER-WEST
Vertical Retorts

Faribault, Minn.

The Faribault Gasworks of the Byllesby Engineering & Management Corporation showing the Installation of Glover-West Vertical Retorts

WEST GAS IMPROVEMENT CO.

Builders of Coal Gas Plants

441 Lexington Ave. New York

New Home Service Department

(Continued from page 68)

burners are properly adjusted with plenty of air. Flame is brisk, dancing, burns all of gas and is hot. Let housewife pass her hand through lazy, improperly adjusted flame, then contrast with proper flame.

6. *Teach women to properly care for range.*
   a. *Do not wipe off with wet cloth while hot. Enamel is nothing but glass fused on metal. The iron expands and contracts more readily than glass, so that when wet cloth is placed on hot enamel the iron contracts quickly and the enamel does not. Result, tiny cracks, called crazing in the enamel.*
   b. *Do not use gritty cleansing agent on enamel. It will wear off the glazed surface leaving a porous surface which catches the dirt very readily. Use cloth wrung from kerosene or gold dust water to remove discolorations. Do this once a day when stove is cold. This will keep the enamel surface spotless and shiny. Do not allow lemon juice, vinegar or other fruit acids to come into contact with enamel as they will eat the glaze off.*
   c. *Clean the burners once a month. Do not boil burners in soapy water without rinsing and thoroughly drying before placing back in position. Suggest dry cleaning in preference. A good stiff scrubbrush, dry to brush off any food that has clogged on top of the burners or stove top. Use large darning needle, hatpin, ice pick or reamer to clear port holes. Remove air shutter and wash well in soapy hot water and dry thoroughly. With long wire handled percolator brush, remove dust and scale from inside of burner, holding open end toward sink or paper. Wipe clean, adjust air shutter and replace on stove. Wiping the burners and burner top of range with cloth moistened in kerosene or sweet oil, each time after washing dishes will help to keep appearance of range as it should be and keep stove from rusting.*
   d. *Treat other appliances in similar fashion.*

B. *Telephone Calls*
   1. *Satisfied with purchase*
   2. *Do they understand way it operates*
   3. *Ask leading questions to be sure.*

C. *Both Home and Telephone Calls can lead to acquaintance with members of clubs and organizations.*

1. *Club Contact Work—All Women's Organizations, Lodges, Clubs, Church Societies, Parent-Teachers Associations, Welfare and Social Improvement Organizations, Girl Scouts.*
   a. *Offer Gas Company Home Service Room for meeting place*
   b. *Suggest luncheons or suppers, including short talks on gas and gas appliances*
   c. *Arrange for single cooking lecture demonstration*
   d. *Arrange for series of lectures*
   e. *Quantity cookery*
      1. *Menu plans for large groups and costs*
      2. *Budgets*
      3. *Suggestions for raising money*
      4. *Correct utilization of gas*
   f. *Short, snappy talks*
2. *Give semi-annual luncheons for all luncheon clubs—Rotary, Lions, Kiwanis, etc.*
3. *Tie-up with educational institutions in each city*
   a. *Give talks on Production, Transmission, Distribution, Utilization of Gas*
   b. *Classes interested*
      1. *General Science*
      2. *Physics*
      3. *Chemistry*
      4. *Home Economics*
      5. *Household Management*
      6. *Household Engineering*
   c. *Use girls from Home Economics Classes as assistants when in city.*
4. *Weekly or semi-weekly articles in newspapers.*
   a. *At least one newspaper in each district*
   b. *If possible one newspaper in each city*
      1. *Article must be seasonal and appropriate average family*
      2. *Always one or two good recipes*
      3. *List of menus and meal planning*
      4. *Party suggestions*
      5. *Household and cooking helps*
      6. *Budgets for food and fuel*
      7. *Occasional quantity recipes*
   c. *Write similar but longer articles for magazines*
5. *Recipes*
   a. *Thoroughly test each one before giving out*
   b. *Have one sheet each week mimeographed for distribution to customers on display or sales floor*
6. *Monthly Bulletin*
   a. *Four or six page leaflet—5 x 7 or 6 x 8*
   b. *Material similar to newspaper and magazine articles*
   c. *Distribute to each consumer*
7. *Cooking Lecture Demonstrations*
   a. *To tie in with club or organization talk*
   b. *Talk on gas appliances, meal planning, etc.*
   c. *Tie in with appliance sales*
   d. *Aid in opening up new towns*

At this place it may not be amiss to insert a suggested outline of procedure for cooking schools.

Preliminary by Director in Charge
- *Obtain place of meeting*
- *Check newspaper advertising*
- *Check advertising literature*
- *Interview society editors*
- *Contact with women's clubs*
- *Arrange for short talks at Luncheon Clubs, Teas, Church Suppers, Lodges*
- *Science departments of high schools and colleges*
- *Borrow furniture for stage set-up*
- *Employees dinner meeting*
- *Recipe sheets, bulletins, invitation cards*

Stage Set-up and Display

Gas Equipment
- *Range with test meter*
- *Refrigerator*
- *Radiant heater and log, test meter*
- *Cabinet Room Heater*
- *Incinerator*
- *Water Heater*
- *Laundry Dryer*
- *House Heating Appliance or burners*
- *Gas Charts*

Furniture
- *Kitchen Cabinet*
- *Two tables porcelain top*
- *Kitchen stool*
- *Screen*

Cooking School
- *Introduction by manager*
- *Lectures each day from 2 to 4 P.M.*
- *Daily change of menu*
- *Combine gas and equipment talks with food demonstrations*
- *Daily prizes and prospect cards*
- *Announce adjustments by Home Service Girls*
- *Attitude toward company*
- *Attitude of employees at meeting*
- *Use gas charts*
- *Range talk by representative*
- *Goodwill talk by company representative*
- *At all times promote gas sales and public relations*

Results

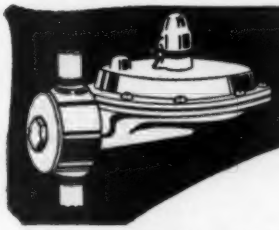
Attendance
- *Type of people*
- *Interest manifested*
- *Comments*

Prospects
- *Number*
- *Kind*
- *Follow-up*

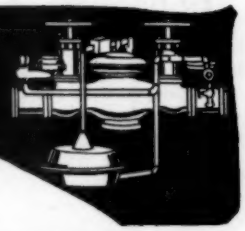
Profits
- *Increased merchandise sales*
- *Increased gas sales*
- *Increased goodwill*

The foregoing outline is designed to cover the usual four or five day group of cooking schools given in connection with

(Continued on page 72)



Gas Control Since 1892



Reynolds
High Pressure Line Regulator

HUNDREDS of this type of Regulator are still giving perfect performance after more than 20 years of service. Improved in details—workmanship to higher standards of precision—yet the original model was so nearly perfect that years of experimenting have changed the original only in detail. The REYNOLDS High Pressure Line Regulator is unequalled for use in industrial hook-up where it is necessary to maintain uniform delivery pressure—reducing pounds to pounds. This Regulator insures positive lock-off plus unusually sensitive regulation.

Representatives:

EASTERN
SERVICE COMPANY
Boston, Mass.

F. E. NEWBERRY
Avon, N. J.

THOS. C. CORIN
Detroit, Mich.

COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

Reynolds
Gas Regulator Company
Anderson, Indiana

New Home Service Department

(*Continued from page 70*)

an appliance sale or piping a new town with gas. Where the cooking schools are of different aspect, the outline may be changed.

To continue with the outline of work to be accomplished by the Home Service Department.

8. Floor demonstrations
- *a. To introduce Home Service Worker*
- *b. To aid in sale of appliances*

9. Luncheons and Suppers
- *a. Company officials*
- *b. Employees Clubs*
- *c. Outside Clubs*

10. Cooperation among women employees
- *a. Get-acquainted teas*
- *b. Organization of social and educational clubs*
- *c. Evening cooking lessons for employees*
- *d. Gas educational talks*

11. Meeting with Sales Force
- *a. What Home Service Is*
- *b. What it can do to aid sales*

12. Restaurant Association
- *a. Hold meetings in Home Service Auditorium*
- *b. Display Restaurant equipment*
  - *1. Instruct in care of gas appliances*
    - *a. Adjusting*
    - *b. Cleaning*

13. Publicity
- *a. Newspaper write-ups*
- *b. Advertisements*
- *c. Monthly bulletins, recipes, contact work, etc.*

Home Service work comprises more than one would think, doesn't it? In many cases, lack of time, help and unforeseen circumstances arising, will interfere with the carrying out of as complete a program as has been outlined but wherever possible, the good Home Service Director is to going to make as much of her work and the work of her department as she can, for it is only through such efforts that Home Service will grow to the proportions it should assume.

When the new Home Service worker has planned and outlined the efforts she intends to make, she must co-ordinate them with the policies as outlined by her company and study the best way to make them apply in each case. Where the work will touch on more than one city it is well to outline her plan of contact with her fellow employees.

METHOD

1. District Comprises
- *a. Territory*
- *b. Cities*
- *c. Personnel*
  - *1. District Managers and Agents*
  - *2. Sales Directors*
  - *3. Sales Supervisors*
  - *4. Sales Force*
  - *5. Service Men*
  - *6. All other employees*

2. Visit District
- *a. Meet personnel*
- *b. Attend Sales Meetings*
- *c. Attend District Get-Together Meetings*

3. Get list of household appliances purchased in each office

4. Make contacts as outlined.

Cozy Corner—Ft. Worth Gas Company

RESULTS

1. Written monthly report should be self-explanatory
- *a. Showing the building of goodwill*
- *b. Reporting customer's attitude toward company*
- *c. Prospect list to assist sales forces*

At the beginning of this article, mention was made of a budget for the Home Service Department. The new Home Service worker will no doubt be as puzzled as to the manner of working this out as she would be about any unfamiliar detail. When planning the budget, the Home Service Director, the official under whom she works and the official in charge of finances will work together. But before meeting with these officials, the Director should have well worked out on paper, the approximate amounts that will be needed for each separate classification of expenses. A suggested budget classification is given below.

HOME SERVICE BUDGET

1. Salaries
- *a. Home Service Director*
- *b. Home Service Assistants*

2. Traveling Expenses
- *a. Expenses traveling outside city*
- *b. Carfare, or automobile expenses inside city*

3. Cooking Classes
- *a. Expenses for food for demonstrations*
- *b. Expenses for prizes*
- *c. Expenses for maid or helper*

4. Sales Promotion
- *a. Expenses for food for floor demonstrations*
- *b. Salary for floor demonstrator (if temporary)*
- *c. Miscellaneous items of expense for sales helps*

Exhibits
- *a. Expenses for booth and decorations*
- *b. Expenses for food*
- *c. Expenses for helper (if needed)*

5. Department Literature
- *a. Expenses for printing monthly bulletins*
- *b. Expenses for recipe sheets for distribution on display floor*
- *c. Expenses for recipe sheets for cooking classes*

7. Advertising
- *a. Expenses for advertising cooking classes*
- *b. Expenses for advertising service offered*

8. Laundry and Miscellaneous
- *a. Expenses laundering uniforms, table linen, etc.*
- *b. Cleaning expenses, rugs, draperies, etc.*
- *c. Window cleaning, wall cleaning*

9. Social Events
- *a. Expenses for food, luncheons, suppers, etc.*
- *b. Expenses flowers and decorations*
- *c. Expenses laundering linens, towels*
- *d. Expenses maid (outside regular working hours)*

10. Kitchen Supplies
- *a. Expenses, soap, cleaners, dish cloths, towels*
- *b. Replacing dishes, pans and other utensils*

11. Office Supplies
- *a. Paper, carbon paper, pens, ink, pencils, typewriter ribbons*
- *b. Cards and filing cases*

In many cases it will be advisable to distribute the items of expense in entirely different fashion, but the foregoing list offers one good working basis. It is up to the Home Service Director, and the officials to change it to meet their needs. It is well to remember that it always looks better at the end of the year to have stayed within a budget that seemed a little large, than to have greatly overrun a budget that was small.

This article has tried to clearly define for the new Home Service Director and for the Home Service worker who has been going along blindly, just what Home Service can mean and how to make it mean the greatest of helps to all other departments of the utility. But it is up to the Director to be constantly on the look-out for new methods of securing results, new ways to assist the public relations and sales departments, new ways to better serve the public. So, the best of luck.

SUPERIOR

from all angles

SUPERIOR SUPERIOR SUPERIOR SUPERIOR SUPERIOR SUPERIOR SUPERIOR SUPERIOR SUPERIOR

SUPERIOR METER CO.
Bush Terminal Bldg. No. 20
Brooklyn, N. Y.

Equipment News

The New Vulcan an Improved Deep Fat Fryer

This new fryer should interest everyone who does deep fat frying for we are told that it vastly improves the quality of deep fat fried foods, and soon pays for itself in fat saved.

It does away with the usual kettle-on-the-stove method of frying which is slow, dirty, expensive and does not produce a uniformly high quality of food, due to difficulty in keeping fat clean and at the right temperature.

In the Vulcan, the production of the finest deep fat fried foods is said to be easy. A heat control keeps the fat at exactly the right temperature for perfect frying. According to the manufacturer an outstanding feature of the Vulcan is its exceptionally fast heat recovery. When a basket of cold food is placed in it, an automatic control turns on a powerful speed burner. Heat is driven through tubes in the kettle, preventing the fat from chilling. As a result the fat is so hot that it sears food immediately retaining the texture and flavor and doing away with any possibility of soggy or greasy tasting foods.

Another feature claimed for the Vulcan is that it cuts expense for fat 75%. The same fat can be used for french fried potatoes, saratoga chips, cutlets, fish cakes, oysters, doughnuts, etc., without affecting the flavor. By merely straining once a day, the fat can be used over and over for several days. The fat is kept so hot that it cannot become rancid. Sediment falls to the bottom, keeping the fat clear and clean with no black specks.

Here are some special construction features—one piece cast iron kettle eliminating danger of leakage. Fat cannot reach flame. Strainer keeps crumbs from dropping to bottom. Radiation is reduced by heavy insulation of walls and corners. Pilot light, easily lighted from outside. Extra large drain for fat with valve conveniently located. Any number of fryers can be easily connected because of special manifold construction.

The manufacturers, Standard Gas Equipment Corporation—New York, will be glad to send a folder describing the fryer in detail.

The Webb "Slingabout"

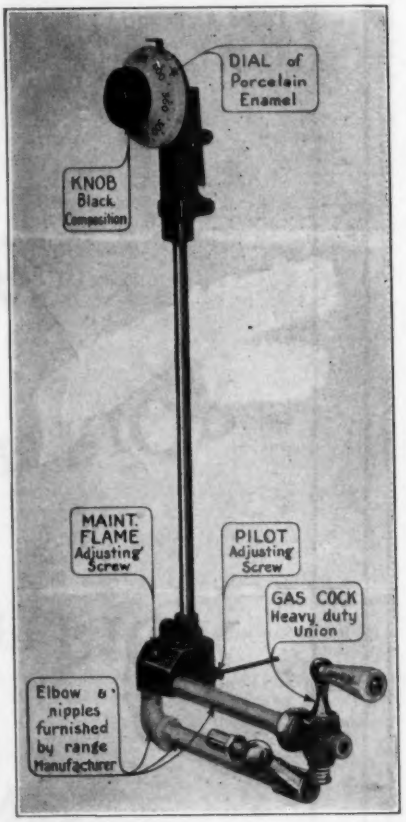
Charles J. Webb & Co., 116 Chestnut St., Phila., Pa., recently put on the market a cover for gas ranges which they call the "Slingabout."

The jacket is made of a waterproofed canvas, similar to that used for tarpaulins, standardized in Olive Drab color and is lined with a heavy flannel which protects the enameled finish from scratches. On some models of ranges, it may be necessary to line one side of the Slingabout which comes in contact with the back of the range with a heavy, tightly woven canvas in order to eliminate the possibility of snagging.

It not only protects the range but creates a favorable first impression when the range is placed in the customer's home. It speeds up deliveries because it is easily slipped on and off and eliminates the necessity of uncrating at the customer's premises. The photograph, shows the padded cover only and this is furnished with a heavy web strap, similar to a trunk strap which holds the Slingabout jacket in place. This strap runs around the range from end to end.

New Heat Control Device for Gas Ranges

The Claus Manufacturing Company, subsidiary of Milwaukee Gas Specialty Company, Milwaukee, Wis., recently announced a new oven heat control called the "Thermolator" for gas ranges. It has a splasher dial mounted control of the concealed type, and is easily installed in new ranges. The illustration taken from their literature indicates the special features. Descriptive matter will be mailed on request.

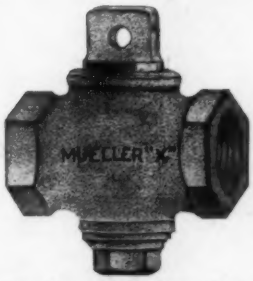

DIAL of Porcelain Enamel
KNOB Black Composition
MAINT. FLAME Adjusting Screw
PILOT Adjusting Screw
GAS COCK Heavy duty Union
Elbow & nipples furnished by range Manufacturer

A New Oxide Conditioner

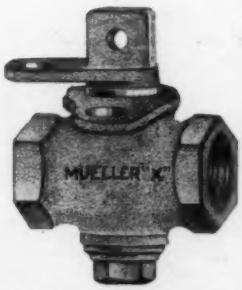
The Universal Sand Equipment Co., Cleveland, Ohio., recently put on the market the Universal Oxide Conditioner, a machine which disintegrates the lumps and aerates oxide purifying in a single operation. The mechanical principle of operation of the machine depends on the rotation of an impellor assembly within an impellor housing having intake and discharge openings. The oxide purifier material can be fed directly from the boxes into the intake hopper of the Universal Conditioner, or shoveled into the machine depending on local conditions. The purifier material in passing through the Oxide Conditioner is subjected to the impact action of the impellor blades which, together with the centrifugal and blast effect developed by the impellor, serve to thoroughly break up the lumps and discharge the material through the air.

Further details of the machine are included in an 8 page folder, which will be mailed on request.

It pays to standardize on Mueller Stops..



Mueller G-11007 Flat Head Service Stops



Mueller G-11026 Flat Head Service Stops

LEADING gas companies have standardized on Mueller Stops, because they have found it pays in terms of dependable service.

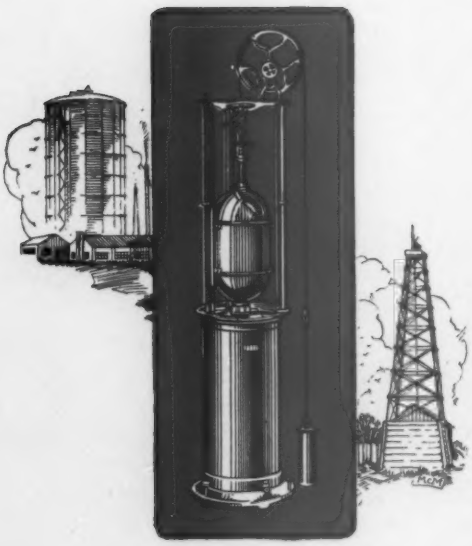
Service is built into Mueller Stops—enduring, dependable performance that eliminates costly service failures. These stops are designed to provide additional strength where installation strain is greatest. They are made of the finest materials, by an organization backed by 72 years of successful manufacturing experience. Painstaking inspection makes sure that every stop is worthy of the Mueller name.

An installation of Mueller Gas Stops—brass or iron body with brass keys—will convince you of their service-giving dependability.

MUELLER CO. (Established 1857), Decatur, Illinois; *Branches:* New York, Dallas, San Francisco, Los Angeles; *Canadian Factory:* MUELLER, Limited, Sarnia.

MUELLER

KNOWN FACTORS CUBIC FEET IN METER VALUE



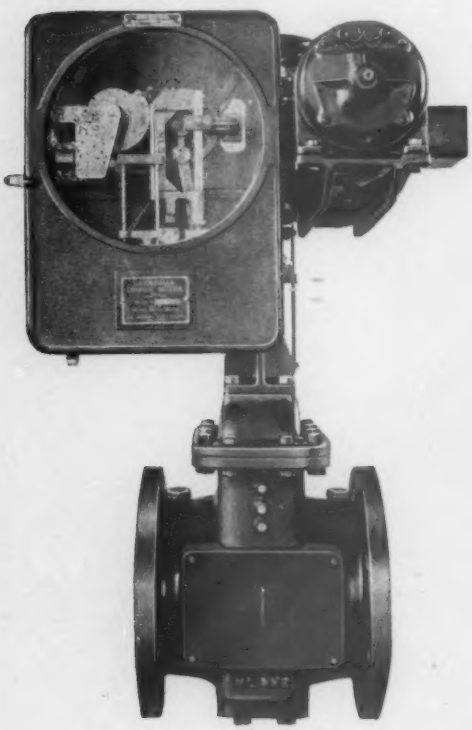
The Higher Standard

In Gas Meters, enduring accuracy, quality construction and time-tested improvements are the essence of value.

There can be no economic justification for "good enough" or experimentation in the volume buying of such important long-term equipment.

For that reason, the vast majority of Gas Companies are guided solely by considerations of *true economy* in the purchase of Gas Meters.

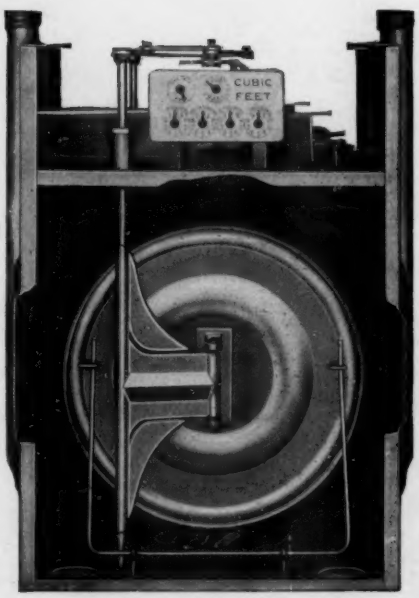
LARGE VOLUME MEASUREMENT
LINDERMAN METERS



AMERICAN METER COMPANY
JOHN J. GRIFFIN & COMPANY
HELME & McILHENNY
MARYLAND METER WORKS
D. McDONALD & COMPANY
METRIC METAL WORKS
NATHANIEL TUFTS METER WORKS
PACIFIC METER WORKS

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

A-TYPE METERS
Tinned Steel Case



KNOWN FACTORS CUBIC FEET IN METER VALUE

In Meter Equipment

American Meter Company Gas Meters are unsurpassed in all the advantages that make for *true economy:*

Up-to-date quality, ample capacity, and an unmatched record for accurate and reliable performance, distinguish every type and model.

Long experience, nation-wide service facilities, manufacturing integrity—in fact all the qualifications that have brought world leadership in Gas Measurement Engineering—distinguish the manufacturer.

The Four Cardinal Points—a guide to effective Meter Maintenance or larger returns on Meter Investment

AMERICAN METER COMPANY

INCORPORATED

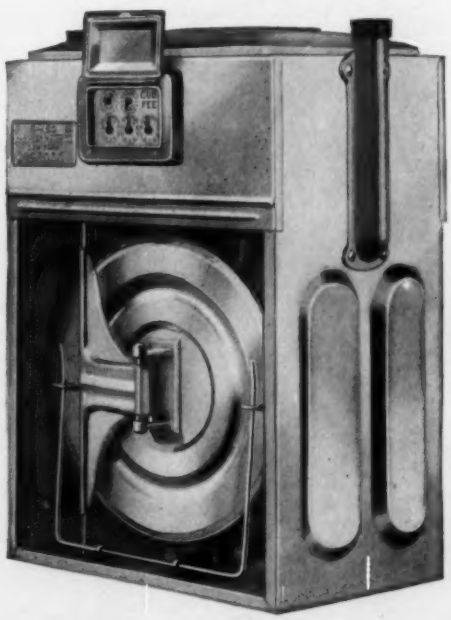
The World's Largest Manufacturers of Gas Meters and Allied Apparatus

ESTABLISHED 1836

General Offices: 105 West 40th Street, New York City

IRON CASE METERS
For Low, Medium, and High Pressures

B-TYPE METERS
Tinned Steel Case



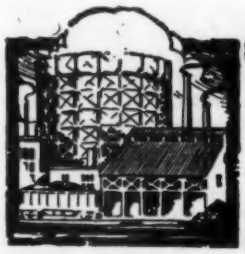
Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

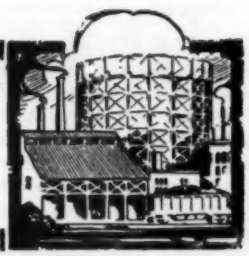
"A" Type Meters "B" Type Meters

THE CLEVELAND GAS METER COMPANY

2168-2180 East 65th Street Cleveland, Ohio



NEWS OF THE GAS INDUSTRY



Southern California Gas Company Expand Transmission System

Contracts aggregating two and a quarter million dollars were awarded recently according to officials of the Southern California Gas Company, for the construction of a twenty inch natural gas pipe-line from Kettlemen Hills to Buena Vista Hills terminal of the Southern California Gas Company system, near Taft, a distance of seventy miles. This transmission line, the largest in Southern California, will have a capacity of eighty-five million cubic feet of gas a day, with an initial pressure of four hundred pounds and makes available a new source of supply of natural gas for Los Angeles and other Southern California cities through the present high pressure transmission lines of the Southern California Gas Company to Los Angeles.

Officials of the Southern California Gas Company stated that work will be commenced as soon as the material arrives, and that it is to be completed during January 1930. Not only will this line aid in the present extensive conservation program of the State, by utilizing natural gas produced as a by-product of crude oil, but it will also assure an additional natural gas supply for Southern California. Under the present program of scientific production in force in the Kettleman Hills gas and oil field, natural gas in large quantities should be available for years to come, thus fortifying the natural gas supplies of the Southern California Gas Company for distribution to the homes and industries in Southern California. Long term contracts covering large areas have been made by the Southern California Gas Company with the oil producers in the Kettlemen Hills field.

In order to facilitate the operation of this twenty inch pipe-line, a private telephone system will be constructed extending from the Company's headquarters at Taft to the headquarters of their Kettlemen Division, at Avenal.

Vicksburg, Mississippi, To Get Natural Gas

Vicksburg, Mississippi, a city of 21,000 population is to be served with natural gas by the Southern Natural Gas Corporation, a unit of the Standard Gas and Electric Company. It will be necessary to build a twenty eight mile pipe line and tap the main pipe line conveying gas from the Louisiana fields to Birmingham and Atlanta. Vicksburg will probably use about 500 million cubic feet per annum. The rates for the gas and the cost of the 28 miles of 8 inch pipe were not stated.

Convention Calendar

December

3-6 Gas Meter Men's Short Course, Mid-West Gas Association. Iowa State College, Ames, Iowa. R. L. Klar, Chairman.

The United Gas Improvement Co. Make Exchange Offer

The United Gas Improvement Company has made an exchange offer to purchase Class B and Class A Common Stocks of the Commonwealth Utilities Corporation, according to a joint announcement of John E. Zimmermann, president of the U. G. I., and Wiley F. Corl, president of the Commonwealth Utilities Corporation. The owners of a substantial amount of Class B common stock have agreed to accept the offer, and deposit their stock with J. P. Morgan & Co., Depositary. Owners of Class B and Class A stocks who desire to avail themselves of such exchange offer must deposit their stock with the Depositary on or before November 22, 1929.

The Commonwealth Utilities Corporation, Incorporated under the laws of the State of Delaware in 1925, through its subsidiaries operates in important commercial and industrial centers located in eight states. A total of 53 communities are served, having an estimated population in excess of 870,000, including the cities of Marion and Delaware, Ohio; Louisville, Kentucky; Springfield, Missouri; Oklahoma City, Oklahoma; Arkansas City, Kansas; Galveston, Texas; Phoenix, Tucson, Prescott and Mesa, Arizona.

Attica, Ind. Now Supplied With Gas

Manufactured gas service has been supplied to Attica, Ind., for the first time to domestic and commercial customers. C. B. Young is local manager of the Attica Electric Company and made the announcement that gas now is available. Work of installing the mains and service connections throughout the city began early in the summer. Gas is transported here through a 4-inch high pressure steel pipe line from the large manufacturing plant of the Northern Indiana Public Service Company in Lafayette. In addition to serving this city, the Attica Electric Company is to inaugurate gas service in Williamsport.

Natural Gas Field Lessening Its Output

The natural gas output from the Fort Collins-Wellington, Colorado fields, which serve the city of Fort Collins and Cheyenne, Wyoming with natural gas has slowed up enough to justify the statement from engineers in the field that it may last two years, perhaps not that long, but on the other hand it may revive and yield for many years.

F. T. Parks, gas engineer and manager of the gas department for the Public Service Company of Colorado has informed the city councils of both cities that there need be no alarm because in the event of the near-by gas fields failing, the gas from Denver which comes from Amarillo, Texas, will be tapped on.

A pipe line is being built from the Amarillo service to Boulder and that will be extended to Fort Collins.

Authorization Given to Extend Gas System

The Iroquois Gas Corporation has been authorized to extend its gas system from Silver Springs, Castile Nunda, and town of Eagle, Wyoming County, N. Y., and to exercise franchises granted by the town board. The proposed construction is 4.2 miles of six-inch and 16.3 miles of eight-inch transmission lines and a distribution system costing about $403,800. It is estimated that the population of the area proposed to be served is 5,377 and that 1,277 consumers will be secured.

Northern Indiana Fuel & Light Co. Sell Gas Plants

M. T. Swain, manager of the Northern India Fuel and Light Company, operating gas plants at Auburn, Garrett, Avilla and Kendallville, Ind, has announced that the plants have been sold to the American Commonwealth Power Corporation, together with fourteen similiar plants in Michigan that have been operated by the Michigan Interstate Fuel and Light Company.

Opens Another Gas Pool In Arkansas

The Arkansas Natural Gas Company, a subsidiary of the Cities Service Company, by bringing in a gas well making 35 million cubic feet of gas daily, has added another gas pool to the map of Arkansas. The well is in Pope county.

Contract for Manufactured Gas

The Louisville, Ky., Gas & Electric Company has contracted with Interstate Public Service Company to supply New Albany and Jeffersonville, Ind., with manufactured gas from its Jackson Street plant, according to an announcement by T. B. Wilson, Vice President and General Manager. The two cities together use about 180,000,000 cubic feet of gas a year, approximately 3 per cent of Louisville's requirements.

The supply of manufactured gas will not reduce the supply available for Louisville's own use, Mr. Wilson said. In fact it will have a beneficial effect. The equipment in the Jackson Street plant, which is capable of producing 3,000,000 cubic feet of gas daily, has been idle since 1924, when the new Beargrass gas manufacturing plant was completed. The plant has been kept in condition to manufacture gas, but, on account of the expense, the Company did not feel warranted in keeping a force of men on hand, so that, although the plant is in excellent condition, it requires a few days to prepare for actual production.

The capacity of the Jackson Street plant is four times the present maximum peak in New Albany and Jeffersonville. By putting the plant in condition to supply these cities, the actual gas supply available for Louisville customers during emergency periods will be increased by more than 2,500,000 cubic feet per day as the plant will be constantly in actual service and can put gas into the Louisville mains in a few hours, instead of in a few days. The Indiana company will also keep one full day's supply in its holders so that in emergencies the entire output of the plant can be used for Louisville.

A pipe line connecting the Louisville plant with the Indiana company's distribution system will be constructed across the new Municipal Bridge.

The Louisville company has been pioneering in the manufacture of gases for use in supplementing the available supply of natural gas. By having the Jackson Street plant continuously in operation to supply Jeffersonville and New Albany, the company will be in a position to carry on valuable experimental work for the benefit of its customers without the usual high cost of such research and solve in advance problems with which it will be confronted during the next few years.

Work on New Gas System to be Started Soon

The town of West Medway, Mass., will be supplied with gas for lighting and heating purposes by the Taunton Gas Company and work on the installation of the new system in Medway will start late this fall or early in 1930. No opposition to the proposition has developed and the Board of Selectmen members are foremost sponsors of the advent of gas mains.

Fire Hose Used As Emergency Pipe-Line

A dredge working in the Saginaw River recently broke through the first of the two six-inch gas mains, of the Consumers Power Company, from Milwaukee to Bay City, Michigan. The dredging company had been engaged by the government to clean out the river channel and were warned about the location of the mains, but the agitators of the dredge smashed both mains before they were stopped.

The break occurred about 12.30 A.M. and by 2 A.M. a crew of nearly sixty men were working on the temporary lines. One thousand feet of fire hose was obtained from the Bay City Fire Department and enough more through the Saginaw Fire Department to make one complete line. The men worked like beavers to build a

Laying Emergency Pipe Line

four inch pipe line across the river which with the fire hose was to carry Bay City's gas supply until divers could locate and make the necessary repairs to the damaged pipe lines.

The next day divers succeeded in placing a sleeve on one of the damaged mains, and there was no need to cut off the gas supply to Bay City. 2,000 feet of hose and pipe were laid in six hours.

North American Light & Power Co. Buys New Gas Properties in Kansas

North American Light & Power Company, Chicago, Ill., has purchased the common stock of the Mid-West Telephone & Power Company, the holding company for the Western Gas Company and the Western Pipe Line Company, which are furnishing natural gas to towns in the following counties of western Kansas: Rush, Barton, Ellis, Russell and Pawnee.

The system contains 113 miles of transmission lines, supplied at present from a well near Bison, in Rush county. The present send-out is around 1,000,000 cubic feet per day, and is increasing rapidly. The Company has purchased also the gas from the British American well near Lewis, in Edwards county, and a pipe line is now under construction from the well to Larned where it will connect with the transmission system.

The towns now served in the new property are: Gorham, Walker, Victoria, Pfeifer, Loretta, La Crosse, Bison, Otis, Olmitz, Hosington, Great Bend, Ellinwood, Timkin and Larned. The transmission lines are now being extended to other neighboring towns, and distribution systems are under construction. The Company will also wholesale gas to the United Pipe Line & Gas Company to serve Hays and other towns in that territory.

Operation of this new addition to the company properties will be directed from Salina, Kansas by E. R. Duree, General Manager of the Kansas Pipe Line & Gas Company.

Pacific Gas & Electric Co. Authorized To Lay Second Natural Gas Pipe-Line

Straight natural gas will be available by July 1, 1930, to 471,000 of the 485,000 consumers in Pacific Gas & Electric Co. territory. The Railroad Commission has authorized the company to lay a second pipe-line from the San Joaquin Valley oil fields to serve central and northern California communities not supplied by the recently completed main to the San Francisco Bay region. The new line will be laid along the west side of the San Joaquin Valley to Martinez, thence via Crockett to San Pablo and Richmond, where it will connect with the line now in operation. One branch from the new main will pass through Modesto, Stockton, Lodi and Sacramento to such distant points as Roseville and Woodland. Another branch will be run across the Carquinez bridge to Vallejo, Petaluma and San Rafael and will also supply Santa Rosa, Napa and other Marin and Sonoma county cities.

Construction of the second pipe-line will provide an alternative source of supply if service is interrupted in one and, on its completion, it will be possible to supply straight natural gas to all consumers and to insure the dependable service associated with the company's reputation.

Meanwhile communities along the present pipe-line in Alameda, Santa Clara and San Mateo counties have been cut over to straight natural gas. The Monterey Bay cities and Fresno will have the new fuel as soon as the connecting mains are laid. Work on cutting over the remaining territory in the P. G. and E. system will begin immediately on completion of the second pipe-line.

The company's natural gas system, when the second unit is built, will consist of more than 750 miles of high-pressure pipe-lines and will represent an investment of more than $27,500,000.

Issuance of Bonds Approved

Issuance of $37,000 in bonds by the Citizens Gas Company of Indianapolis, Ind., has been approved by the Indiana public service commission. Funds derived will be used to re-imburse the company for improvements made to the gas system during the first six months of this year.

BIG CLAIMS

and unusual performances!

You may think our claims extraordinary. You may feel that a grain of salt is essential. But we sincerely ask you to try the cements we recommend——try them with the assurance of our unusual guarantee!

Whether you operate a coal gas plant, a water gas plant or a coke oven plant, you'll find that one of the cements listed below will comply exactly with the service you require. You will find that R & E Refractory Cements are the best you've ever used—not because we say so but because they actually prove it in many plants.

Our Guarantee

You cannot tell 'til you try. You cannot even imagine how many extra hours of service R & E Cements will give until you prove them in your plant. And when we guarantee longer service, guarantee your satisfaction and lower final costs, how can you miss the opportunity?

Send for a trial order, it will cost you nothing if you are not satisfied.

For Coke Oven Plants

For Water Gas Plants

REFRACTORY & ENGINEERING CORPORATION

Engineering & Manufacturing Specialists in High Temperature Cements

50 Church St., New York, N. Y.

Pittsburgh Baltimore Philadelphia Chicago

R. & E. ‡3000

You can't find a better cement for all-around service in gas plants. R & E ‡3000 air-sets to full strength; always retains its bond, makes brick dislodgement impossible when "barring down", will not crumble. Unusual adhesiveness makes ‡3000 extremely efficient for hot or cold patching. Fine texture permits extremely thin joints which, together with its excellent bond, is a further safeguard against bricks "pulling out".

‡3000 will not bloat or puff at low temperatures; does not crumble or fall when equipment is "off the line." Withstands temperatures in excess of 3000° F.

Conveniently shipped ready for use in plastic form in 500 lb. and 800 lb. steel drums. Try a drum today.

"MOLDIT"

We recommend Moldit for such work as monolithic floors, checker work and arches. It avoids delays in waiting for special tiles or brick. Just add a little fresh water and mold it into any desired shape.

Moldit "air-sets" and attains full strength without heat. It does not shrink and meets the most severe requirements of modern construction. You can use Moldit under temperatures up to 3000° F. It's easy to use, too. Add a little fresh water and pour—no ramming, no hammering—just mold it. Weighs only 100 lbs. molded. Shipped in convenient 100 lb. waterproof bags.

"Moldit-A"

Use Moldit-A for service under temperatures between 200° F. and 2400° F. It works the same as "Moldit" and can be used for monolithic floors, standpipes, doors, etc., any place where great structural strength is essential, or desired.

Like other R & E Cements, Moldit-A air-sets and gains full strength without heat. It weighs approximately 100 lbs. per cubic foot and is shipped in 100 lb. handy waterproof bags.

Order a few bags on trial today.

R & E REFRACTORY CEMENTS

Personals

Robert W. Miller, of San Francisco, Cal., was named a director of the Los Angeles Gas & Electric Corp., at a recent meeting of the Board of Directors. He will fill the vacancy made by the passing of the late William Baurhyte. Mr. Miller is Executive Vice President of the Pacific Lighting Corporation and is actively connected with other utility enterprises in the state.

C. W. Whitwell has become associated with H. M. Byllesby & Company, in charge of sales throughout the state of Ohio. Mr. Whitwell will make his headquarters at 1401 Union Trust Building, Cleveland, Ohio.

Verne Hahneman was recently promoted to Sales Manager of the Public Service Company of Northern Illinois, at Joliet. He was formerly Chief Salesman at Waukegan, where he was succeeded by Howard Grant.

Otto Gressens was recently appointed Assistant to President Britton I. Budd of the Public Service Company of Northern Illinois, Chicago. Mr. Gressens is particularly fitted for his position by his previous experience and education. He holds a doctor's degree in economics from the University of Illinois, where at one time he was statistician of the Bureau of Business Research.

A. B. Gigley has been appointed Appliance Superintendent of the Hastings, Mich., District of the Consumers Power Company.

Bernard F. Braheney has been elected vice president in charge of accounting, Byllesby Engineering and Management Corporation, Chicago. Mr. Braheney has been with the Byllesby organization since 1910, beginning as a clerk in the auditing department of Northern States Power Company at Stillwater, Minnesota.

In 1913 Mr. Braheney was made accountant of the Minneapolis General Electric Company in the Northern States Power Company system, and in 1915 he became traveling auditor of the Company. In 1915 he was appointed assistant general auditor of Northern States Power Company, which position he held until 1920 when he was made assistant general auditor of Byllesby Engineering and Management Corporation with headquarters in Chicago. Since 1923 he has been general auditor of the Company.

Clarita S. Hinde has been appointed Personnel Assistant to the Los Angeles Gas & Electric Company. This position is a newly created one in recognition of the increasing part which women are playing in the affairs of the company. Mrs. Hinde was connected with the Public Relations Department for two years.

The Personnel Assistant will have a variety of duties. She will interview all women applicants for employment, and recommend prospective employees to department heads when positions are to be filled, thus relieving the Superintendent of Employees of that part of his work. In addition, she will be the connecting link between the management and the women employees as a group.

Mrs. Hinde is a graduate of Sullins College in Virginia. She also completed a secretarial course at a San Francisco business college. At Sullins College she received valuable faculty experience as Librarian.

Leo Roemer has been appointed to the position of Auditor of the Eastern Oregon Light and Power Company, Baker, Oregon. Mr. Roemer has been associated with the Wisconsin Public Service Corporation for the past three years and was assistant auditor at the Green Bay office.

Alfred R. Burr, who had been new business manager of the New Haven, Conn., Gas Light Company since 1903, has been appointed Superintendent of Stores.

C. W. Tennant recently assumed new duties as manager of Merchandise sales of the Western United Corporation Aurora, Ill. Mr. Tennant will have charge of the promotion of all merchandise sales. He was formerly manager of the Southern District and is succeeded by D. H. Sims, formerly district superintendent.

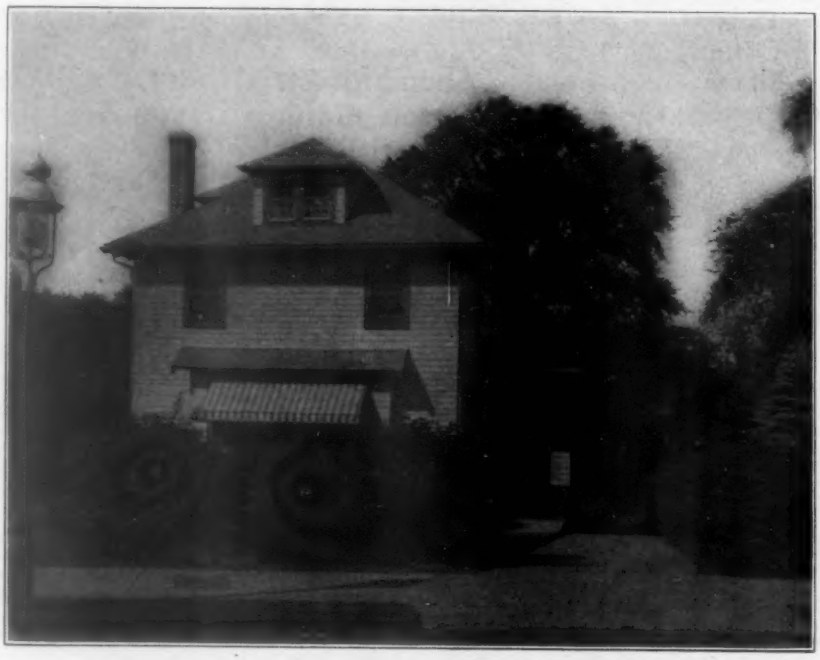
J. T. Sullivan, gas and water superintendent of the Truckee River Power Co., Reno, Nevado, has been transferred to the City Gas Company of Norfolk, Va.

William Heerman has been put in charge of the new department of Public Relations of the Wisconsin Public Service Company, Sheboygan, and is also directing employees' educational work for that division. Mr. Heerman is a graduate of Lawrence College.

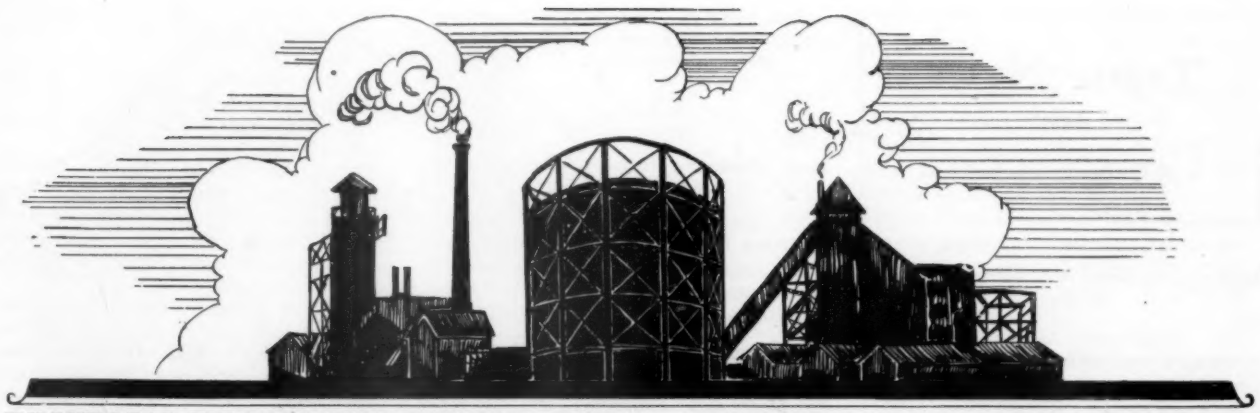
Alexander M. Scudder has been named sales supervisor of the Athens district of the Georgia Power Company, succeeding H. S. Chandler, who has been transferred to the Atlanta district. Mr. Scudder has been with the company ever since it acquired the former Athens company.

Clarence W. Martin recently joined the New York Power organization at Albany as Engineer in the Industrial Sales Department. Mr. Martin came from the Utica Gas and Electric Company, where he was employed since 1919.

An All Gas Home



All gas residence of John J. Quinn, President of the New England Gas Association and Manager of the Quincy Division of the Boston Consolidated Gas Company, Quincy, Mass. It is heated by gas, uses gas laundry dryer, stove and ironer, automatic radiant heater in fire place in living room, incinerator, auxiliary radiant heater (flued) in bathroom and auxiliary gas lights in four important locations



BRISTOL'S RECORDING INSTRUMENTS SIMPLIFY OPERATION CONTROL

Uniform Temperature at Tar Extractor Insures Maximum Precipitation

Very Efficient Operation Maintained Under Direction of Bristol's Recording Thermometers

Temperatures in the tar extractor must be controlled within close limits if the condensation system is to operate at maximum efficiency.

If the temperature is allowed to run too high much of the tar passes into the secondary condenser, where sudden chilling causes it to precipitate into large drops which occlude and carry down the light oils with them.

Again, if the temperature drops too low, extraction will be attended by the loss of necessary light oils which are carried down in the tar extractor itself, with consequent loss of heating value of the gas.

By keeping the operator constantly posted on temperature conditions at all times Bristol's Recording Thermometers, such as that shown on this page, enable him to consistently maintain the close temperature control that is imperative to the success of the process. Every variation in temperature is instantly recorded on the instrument chart. It needs only an occasional glance to determine exactly what the temperature is, what it has been, and the direction in which it is leading.

Every Bristol's Thermometer is guaranteed accurate in calibration. They are simple in design and of rugged construction throughout; which insures many years of trouble-free service with very little care and attention. Catalogs, bulletins, etc. will be sent to any interested person in your plant immediately on receipt of correct name and address. Write nearest branch office or direct to main plant at Waterbury, Conn.

The BRISTOL Company

Waterbury, Conn.

BRANCH OFFICES.

Boston
New York
Philadelphia
Birmingham
Pittsburgh
Detroit
Chicago
St. Louis
Akron
Denver
San Francisco

TRADE MARK
BRISTOL'S
REG. U.S. PAT. OFFICE

The Most Extensive Line of Recording Instruments and Automatic Control Equipment

Pressure Gauges for both permanent mounting and portable test work; Vacuum Gauges, Liquid Level Gauges, Thermometers, Pyrometers, Psychrometers, Voltmeters, Ammeters, Wattmeters, Electrical Operation Recorders, Mechanical Motion Recorders, Tachometers, etc. Also Automatic Control Equipment and Controller Valves for controlling temperature, pressure, liquid flow, liquid levels, etc., etc.

At the Downtown Office of Several Mid-Western Gas Companies . . . . .

Bristol's Atmospheric Recording Thermometers, using 7-day charts, are installed to provide weekly records of outdoor temperatures. Such charts with records are kept on file in cashier's cage and used to remind customers of some forgotten cold snap, should complaint be made of abnormal monthly gas consumption and apparently unjustified increase in billing. The unbiased truth of these records is apparent, and usually sufficient to settle disputes quickly, satisfactorily—and *permanently*. Complete details regarding this type of Bristol's Recording Thermometer will be sent you on request.

Bristol's Out-door Atmos-pheric Thermom-eter. Can be furnished with 25 ft. connecting tubing to sensitive bulb and protective latticed weather house. Uses Record-ing Record-ing 12" and 8" charts.

ENGINEERING SERVICE

Have Bristol's Sales Engineers make a complete survey of Instrument needs in your plant. Their wide experience prepares them to specify exactly the right equipment to suit your particular requirements. There's no obligation entailed.

Trade News and Construction

United Engineers & Constructors, Inc., Activities

The Manchester Gas Company has awarded a contract for a U. G. I. Vertical Chamber Oven Plant, with 2 - 8'6" producers and auxiliary equipment.

The Philadelphia, Pa., Gas Works Company, is making further addition to its condensing facilities by an additional 8-pass high duty condenser.

The Central States Electric Company of Iowa Falls, Iowa, have just placed contract for one (1) 4'0" Carburetted Water Gas Set with Chrisman Cycle, circular platform, high duty condenser and by-pass, electric fuel hoist and charging barrow, for their Iowa Falls, Plant.

The Atlantic City, N. J., Gas Company has recently purchased one new 11' generator with linings and fittings.

The Central States Electric Company of Cedar Rapids, Iowa, have purchased for their Creston, Iowa plant, the necessary materials for the installation of Chrisman Cycle for one of their sets.

The Gas and Electric Improvement Company of Boston, Mass., has contracted for the installation of approximately 12,000 feet of 6" welded steel gas main in the property of the Clinton Gas Light Company.

The Syracuse, N. Y., Lighting Company Inc., has authorized the installation of approximately 12,500 feet of 4" steel main in the Syracuse, N. Y., situation.

The Philadelphia Gas Works Company has given authorization to furnish and install necessary changes to 10 carburetted water gas sets at the Philadelphia Stations for use of the Steere Backrun Process.

Two New Connersville Blower Catalogs

Bulletin No. 305 of The Connersville Blower Company illustrates by view of different installations, the adaptability of Connersville Patented Rotary Displacement Meters to the unusual as well as ordinary requirements, for the dependable accurate measurement of gas in manufacturing, distribution and industrial consumer installations.

The Connersville Blower Company also recently issued bulletin No. 123 which describes the "RSB" and "RBB" Series of rotary positive blowers, which bring to process industries the assurance of positive delivery of air in medium volumes at normal pressures up to ten to twelve pounds per square inch. The features of these blowers are the Boston type arrangement with the double outer bearing supporting both shafts, the use of renewable split sleeve babbitt lined bearings or of anti-friction bearings. The bulletin also contains tables of capacity and pressure ratings of the different blowers built in this series.

New Company Incorporated to Make Gas Fired Boilers

The Steam and Combustion Company, 205 West Wacker Drive, Chicago, Ill, has been incorporated for the production and sale of gas fired boilers and kindred lines. The company is owned and operated by the G. W. Dulany Trust, Chicago. G. W. Dulany, Jr; is Chairman of the Board, C. B. Page, President, Wm. E. Eberhart, Vice President and Treasurer, and Jas. E. Moore, Secretary and Assistant Treasurer. Directors include all of the officers and G. W. Dulany III, L.A. McDowell and W. R. Zitzewitz. Mr Page has been a consulting engineer in Chicago for a number of years. His work included the direction of an organization, sponsored by the Dulany Trust, engaged in advanced engineering studies and experiments along the lines of automotive steam power. While proceeding with this work, there have resulted certain valuable developments, by-products as it were, of the main objectives which are readily standardized and for which there is an immediate market. These are to be handled by the new company. The gas fired boilers now being placed on the market are produced in association with the Freeman Manufacturing Co., Racine, Wisconsin and the National Machine Works, Chicago. The former are boiler manufacturers and the latter are specialists in gas combustion equipment. Mr. McDowell, a director of the new company, is president of the Freeman Manufacturing Co. and Mr. Zitzewitz, also director, is president of the National Machine Works.

A. J. Brooks Joins American Meter Company

A. J. Brooks has resigned as Sales Manager of the Cincinnati Sales Division of the Vacuum Oil Company to become associated with American Meter Company at Albany, N. Y.

Mr. Brooks is a graduate of Yale University in Electrical Engineering, and of New York University in General Accounting. He has also had several years of technical manufacturing and sales experience with the Gardner Lucas Company, Inc. as Factory Manager, and as General Sales Manager with the Herman Behr Company (since 1928 the Behr-Manning Company), Brooklyn, N. Y.

Appointments and Changes Made in Consolidated Coal Company

Effective November 1st, 1929, the following appointments and changes in the General Sales Department of the Consolidated Coal Co. were announced.

Mr. R. C. Gilbert, Manager of the Detroit Office, was transferred to Cleveland and appointed Manager of the Cleveland Office.

Mr. A. G. Olson, Manager of the Cleveland Office, was transferred to Detroit and appointed Manager of the Detroit office.

Mr. E. C. Payne, Western Service Manager, was transferred to New York and appointed Manager of the New York Sales Office, vice Mr. J. F. Carney who, after many years of service with this company, has resigned.

Mr. H. A. Damcke, Eastern Sales Manager, who has been identified with sales activities of this company for many years, has resigned to engage in other business. The title of Eastern Sales Manager is discontinued.

Architects' Handbook on Ideal Gas Boilers

The American Radiator Co., 40 West 40th St., New York, have recently prepared a catalog entitled "Architects' Handbook on Ideal Gas Boilers". This handbook shows the complete line of Ideal Gas Boilers and the equipment furnished with them—the ratings, dimensions and data of the different size boilers which will be very useful in specifying gas boilers for house heating. There is also a section on hot water supply which contains detailed tables and simple formulas for determining the proper size and type of Ideal Gas Boiler for any specialized hot water supply job.

Semet-Solvay Engineering Corp. Contracts

The Consumers Power Company, Lansing, Mich., has placed an order for a quantity of plant piping. The pipe will be of welded steel construction and will range in sizes up to 30".

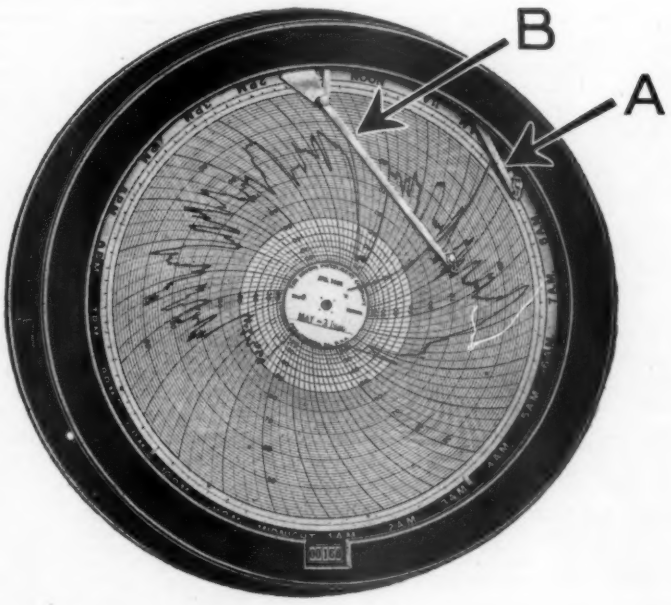
The Wisconsin Public Service Corporation, Sheboygan, has ordered a quantity of plant piping for use in the compressing, purifying and condensing systems of the company's gas plant. It ranges in size from 4" to 24".

The gas consumers of Rhinelander, Wis., will be served this winter from a complete new carbureted water gas plant being built for the Oneida Gas Company. Work is rapidly nearing completion.

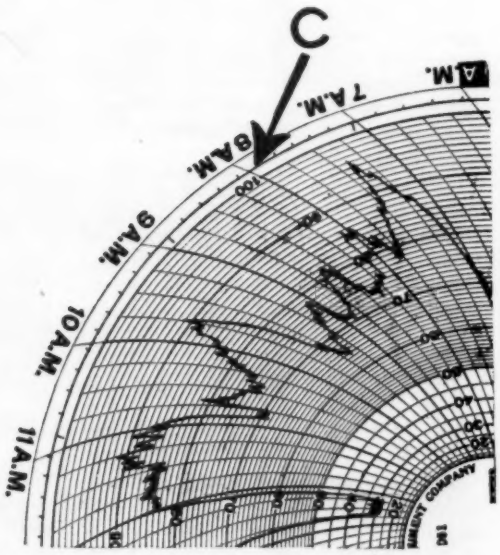
The equipment includes a building of steel and concrete, fuel handling system, water gas machine with backrun, washer cooler, multiple washer, exhauster, tar separator, purifier and relief holder, as well as all required gas, water, steam and oil piping. The superheater of the water gas machine will be provided with spray connections which will permit converting plant effluent of water into backrun process steam.

A quantity of piping is being furnished the Illinois Anthracite Corporation, Chicago. The pipe is to be used on an exhauster system and ranges in size from 4" to 24".

(*Trade News Continued on page 86*)



Probably the most valuable feature ever offered in a recording flow meter is the Brown Automatic Recording Planimeter, supplied, where specified, as an integral part of the Brown Recording Electric Flow Meter. Operation of this feature causes pen A (at left) to record AMOUNT *of flow in specified units, while pen B records* RATE *of flow. By simply counting the number of units recorded the total flow for any period may be determined direct from the chart record. C shows record made by pen A.*



Right on the chart

AMOUNT and RATE of steam flow

THE Chief Engineer of a large industrial plant told us the other day that he had had no idea that there was any instrument that would record information on a chart as to the total amount of steam used.

Get this right. The Brown Flow Meter not only records rate of flow on the chart, but records the *amount* of flow so that you can tell just how much steam was delivered to the line during any portion of the period covered by the chart.

In feeding steam to gas sets or to any steam using unit, this information is valuable from both an operating and accounting standpoint. It is one of the most useful features that has ever been offered in any flow meter and it is a feature that can be had *only* with the Brown Flow Meter.

Write for data or quotations on temperature, flow, pressure and liquid level measuring, recording or controlling instruments of special interest to gas production and distribution men.

THE BROWN INSTRUMENT COMPANY
4473 Wayne Avenue, Philadelphia, Pa.

Branches in 20 principal cities.

Brown Electric Flow Meter

on the Inductance Bridge Principle

"To measure is to economize"

Trade News

(*Continued from page 84*)

Servel, Inc. Purchase Swedish Patent Rights to Electrolux Absorption Refrigerator in United States

Colonel Frank E. Smith, President of Servel, Inc., has announced that the company has purchased the entire Swedish interests in patent rights to the Electrolux Absorption Refrigerator in the United States, its possessions and Cuba and Canada.

In addition to acquiring the patent rights, Servel, Inc., in the deal just consummated, obtain rights to any future developments in refrigeration and any patents resulting therefrom, which may originate through the Swedish interests in their several laboratories in Stockholm, London and Berlin.

A stockholders meeting of Servel, Inc., has been called for November 26, to authorize the increase in common stock from 1,600,000 to 2,000,000 shares, which is to permit Servel, Inc., to retire the notes given to the Swedish interests by conversion into common stock at $20 per share.

New M-S-A General Catalog

The Mine Safety Appliances Company, Braddock, Pittsburgh, Penna., has just issued their new No. 4 General Catalog of one hundred sixty pages covering "Everything for Mine and Industrial Safety." Copies will be furnished gratis to all those interested in the safety and welfare of employees, upon application to the Advertising Department.

This new catalog contains an unusually large number of illustrations, many of which are reproduced in colors.

The catalogue is subdivided into the following general classifications of products: Edison electric safety cap lamps and accessories, permissible shot firing devices, Wolf flame safety lamps, gas and air measuring devices, rock dusting equipment, oxygen breathing apparatus, a complete line of gas mask respiratory protective equipment, gas detectors and recorders, resuscitation equipment, eye and head protective equipment, safety clothing, safety saws and a complete line of first aid supplies. Unusual features include the "Lung," a practical submarine self-rescue device and an improved gas mask face piece developed in the M-S-A experimental laboratories.

Bailey Meter Co. Issues Several New Bulletins

The Bailey Meter Company of Cleveland, Ohio, is now distributing a general bulletin which briefly describes all products of its manufacture.

The products listed in this bulletin are Automatic Control, Boiler Meters, Multi-Pointer Gages, Tachometers, Fluid Meters, both the mechanically and electrically operated types; Temperature and Pressure Recorders, Steel Meter Boards, Feed Water Regulators, Pressure Reducing Valves, Drainage Controls, Pump Governors, Copper Tubing and Compression Fittings, Selsyn Operated Devices, Weir Meters, Gas Meters, Gravity Recorders for liquids and Caol Meters. This four page bulletin contains fifteen illustrations as well as references to other bulletins which give complete information on the various products. "Selsyn Operated Devices for Remote Indication and Record of Liquid Level, Flow, Pressure, Temperature, Draft, Position and Other Factors," is the title of the twelve page bulletin No. 110.

This catalog explains how the Selsyn motor, a device which is in use on the more modern battleships for directing and controlling gun fire, has been applied to the long distance transmission of various indications and records.

The application of the Selsyn motor to control systems is also explained in this bulletin.

Bulletin No. 82 entitled, "Bailey Thermo Hydraulic Feed Water Regulators" describes and illustrates thermo hydraulic feedwater regulators in all pressure standards up to and including 1350 pounds per square inch.

While the principle of the thermo-hydraulic feed water regulator has been known and used for years, the Bailey Regulator described in this bulletin embodies many new and distinctive features never before offered in any type of feed water regulator. The tight-seating piston type of V-port valve as used in all Bailey Feed Water Regulators is described and illustrated.

E. P. Dillon Appointed Vice-President and Associate Engineer of E. Y. Sayer Engineering Corp.

Mr. E. P. Dillon has been appointed Vice- President and Associate Engineer of the E. Y. Sayer Engineering Corporation, New York City. To his new position, one concerned with the design and construction of power and industrial plants for any purpose, Mr. Dillon brings an unusually diverse and comprehensive experience in both the technical and the commercial phases of engineering. Graduating from the Engineering School of the University of Colorado in 1899, he spent the next ten years in power-plant design and construction and in the operation and management of steam and hydro-electric power systems as well as gas plants.

In 1918 he was made general manager for the Research Corporation of New York, in charge of sales of the Cottrell processes of electrical precipitation to the chemical, metallurgical, gas, electric and industrial fields.

Mr. Hugh M. Beugler has also become associated with the organization in connection with the development of various engineering and construction projects.

Richard J. Clark Now Associated with American Meter Company Laboratory

Richard J. Clark, until recently General By-Product Foreman with the Consolidated Gas Company of New York, has become associated with American Meter Company at the D. McDonald & Co. factory in Albany, N. Y.

Mr. Clark was awarded the Physics and Chemistry Medal at Lehigh University, where he graduated in 1922 with high honors and a Ch. E. degree. Since 1922 his experience includes extensive operating and experimental work with the Bethlehem Steel Corporation, the Jones Laughlin Steel Corporation, the Koppers Company, and the Consolidated Gas Company.

Mr. Clark will devote his entire time to the research activities in displacement measurement that are being conducted in

STATEMENT OF THE OWNERSHIP, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of American Gas Journal, published Monthly at New York, N. Y. for October 1, 1929.
State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared S. G. Krake, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher American Gas Journal, Inc., 53 Park Place, New York; Editor, H. M. Riley, Douglastown, N. Y.; Managing Editor, H. M. Riley, Douglastown, N. Y.; Business Manager, S. G. Krake, Jamaica, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)
S. G. Krake, Jamaica, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

Stanton G. Krake,
Manager.

Sworn to and subscribed before me this 1st day of October, 1929.
[Seal.] Rozella Bennett.
(My commission expires March 30, 1931.)

Wins Universal Acclaim!

NEVER in the entire history of the gas industry has a gas appliance been accorded such frank enthusiasm and praise by trade and public alike as has been given "Magic Chef"—the New Vogue in Gas Ranges.

Concrete evidence of this country-wide acclaim is represented by the hundreds of letters and telegrams from every gas-served community in the United States, each carrying its message of warm congratulations to American Stove Company on its latest achievement.

And yet this is but part of the story. The true measure of the worth of "Magic Chef" will come when it is delivering cooking service in the kitchens of the American Public.

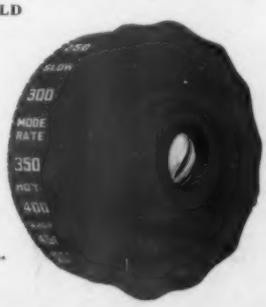
For—"Magic Chef," in addition to being the most artistic gas range ever designed, is also the most efficient and the most serviceable cooking appliance yet offered. A single sentence tells why——"Magic Chef" embodies a combination of unusual, unique even, service features, the like of which no gas stove has ever possessed.

Without a doubt, "Magic Chef" is injecting into the gas industry the greatest interest and enthusiasm created by any gas appliance since the introduction of the Red Wheel a decade ago. It will pay you to watch the career of "Magic Chef" because it is destined to achieve enviable leadership and ever-increasing popularity.

AMERICAN STOVE COMPANY · *Dept. A, 801 Chouteau Ave., St. Louis, Mo.*

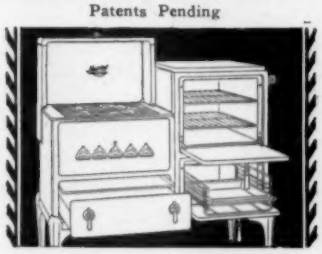
LARGEST MAKERS OF GAS RANGES IN THE WORLD

Magic Chef
AMERICAN STOVE COMPANY



UNLESS *the Gas Range has a* RED WHEEL *it is NOT a* LORAIN

Patents Pending



1. *"Patrician"* Model shown [above] in Italian Grand Antique Marble Finish with Old Ivory Trim. Handles of Onyx Green Bakelite. Also *"Jonquil"* Model in Old Ivory with Peacock Green Trim.
2. The "Magic Chef" Oven is equipped with the famous Lorain (Red Wheel) Oven Heat Regulator.
3. Cooking-top-cover spring-balanced easy to operate. Utensils quickly covered.
4. "Magic Chef" Oven, is heavily insulated. Keeps kitchen cooler when baking.
5. Pipes, gas valves, bolts are concealed. Valves convertible by the turn of a screw into "safety" valves.
6. Unique Broiling-feature includes an extension carriage that brings broiling pan into full view for the easy turning of meats. Reversible broiling pan requires no rack.
7. Top burners of new, vertical-injection type have removable non-corrosive heads. Each burner can be used as a simmering or a giant burner.

CASH PRICE

$195.00

($210 West of the Rockies)

NEW
Smoothtop
REG. U.S. PAT. OFF.

new design

new models

new features

new insulated oven

NEW
ORIOLE
REG. U.S. PAT. OFF.

new automatic time and temperature control

new burner lighter

new concealed manifold

The enthusiastic response of the Gas Industry to the new appliances exhibited by us at the A. G. A. Convention is most encouraging and very much appreciated.

STANDARD GAS

Sales Offices—
NEW YORK—BALTIMORE—CHICAGO—PORTLAND (OREGON)—LOS ANGELES, CAL.

NEW
Acorn

new
cabinet line

new
concealed manifold

new
refrigerator range

NEW
VULCAN

new
high speed broiler

new
deep fat fryer

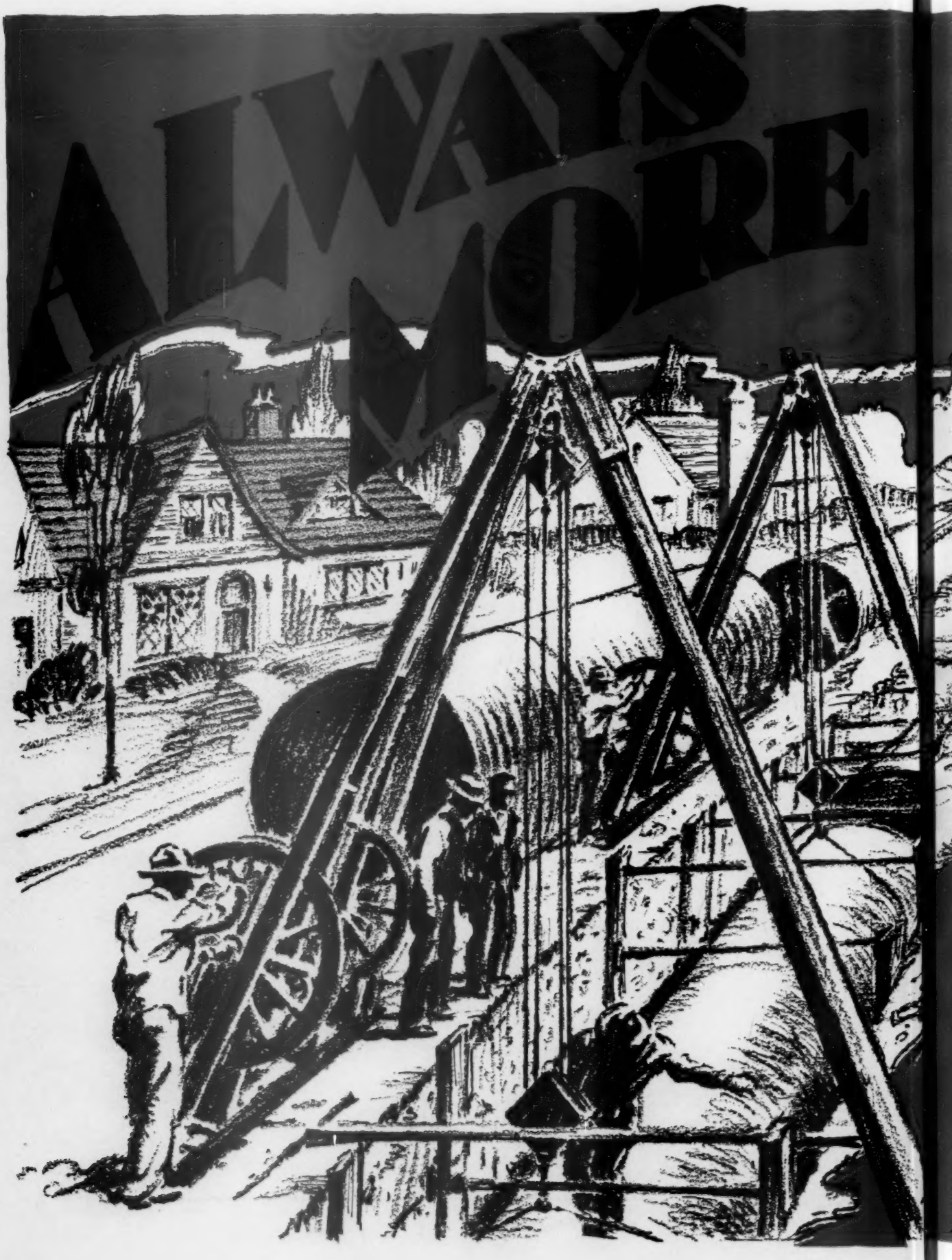
new
griddles

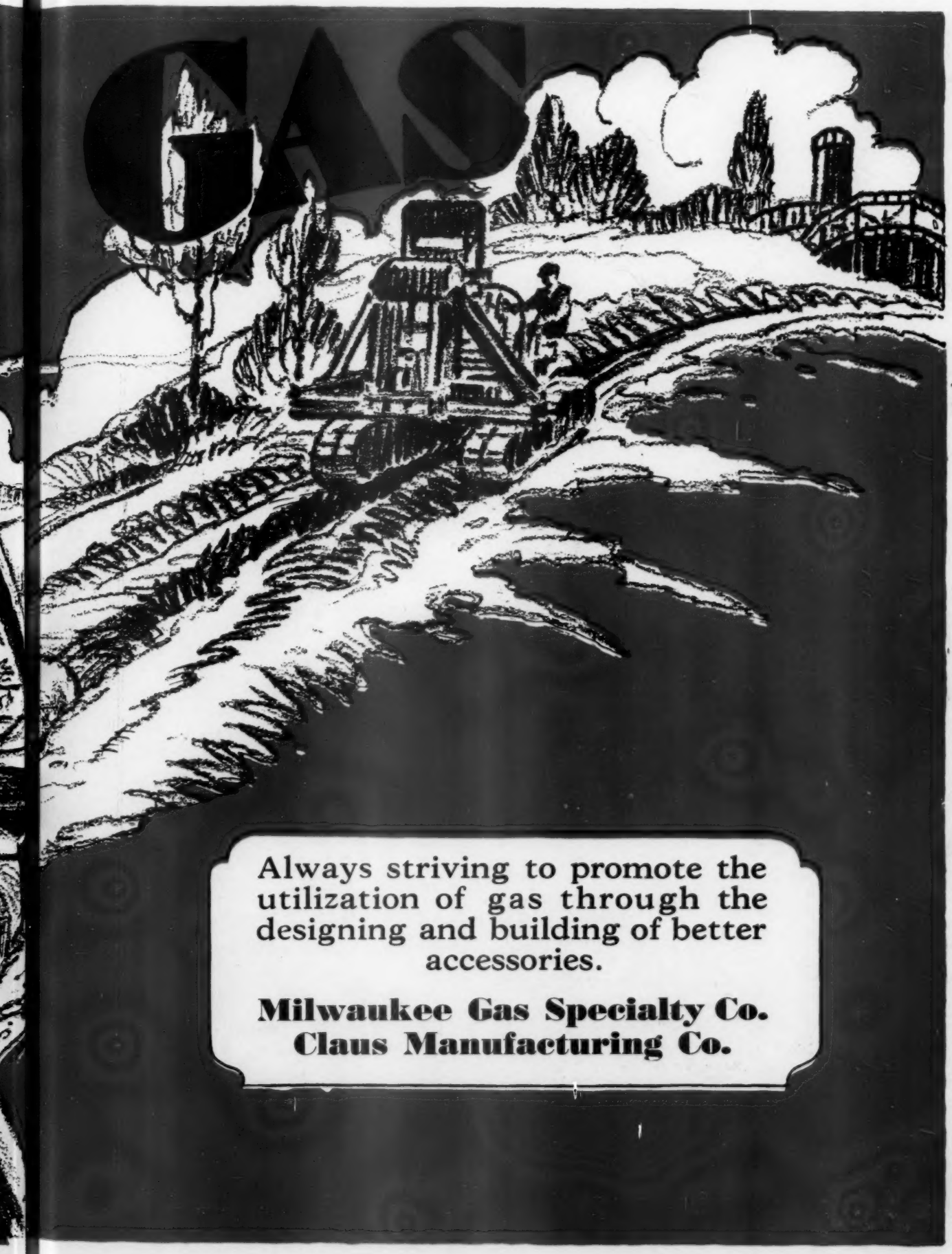
The Hotel appliances are now in production. The Domestic ranges will be in production on January first.

Further announcements will follow.

EQUIPMENT CORP'N.

***Factories*—JERSEY CITY—BALTIMORE—BIRMINGHAM—AURORA**


ALWAYS
MORE



Always striving to promote the utilization of gas through the designing and building of better accessories.

Milwaukee Gas Specialty Co.
Claus Manufacturing Co.

No. 903—Extension Rack Type

SPECIAL FEATURES

Judelson Dryers may now be had in two styles and several sizes—all equipped with the highly efficient Judelson System of heating, ventilation, evaporation, and fresh air circulation; insulated bodies; automatic heat control; panels or baffles that protect user from blast of heat when loading or unloading racks—and finished attractively in grey with light blue trim.

You will appreciate the ease with which the Judelson Dryer can be assembled and installed. Any handy man can assemble the drawer or cabinet style in a few minutes time—an outstanding Judelson feature.

JUDELSON Clothes DRYERS displayed on Your Show Room Floor Create Many Easy Sales

Their attractive appearance, sturdy construction and desirable special features stimulate immediate interest. It is easy to demonstrate that Judelson Dryers are safe and easy to use, highly efficient, economical in performance—and why they dry clothes better and quicker than the old-fashioned outdoor method. A demonstration convinces the most skeptical prospective buyer and completes the sale.

Every user of a domestic washing machine should have a clothes dryer and many will buy one now if you show them the Judelson. If clothes are no longer washed as in ancient times why should they not be dried in an efficient, labor-saving—modern way? It is simply a question of changing thought from an old-fashioned method of doing things to a new and better way.

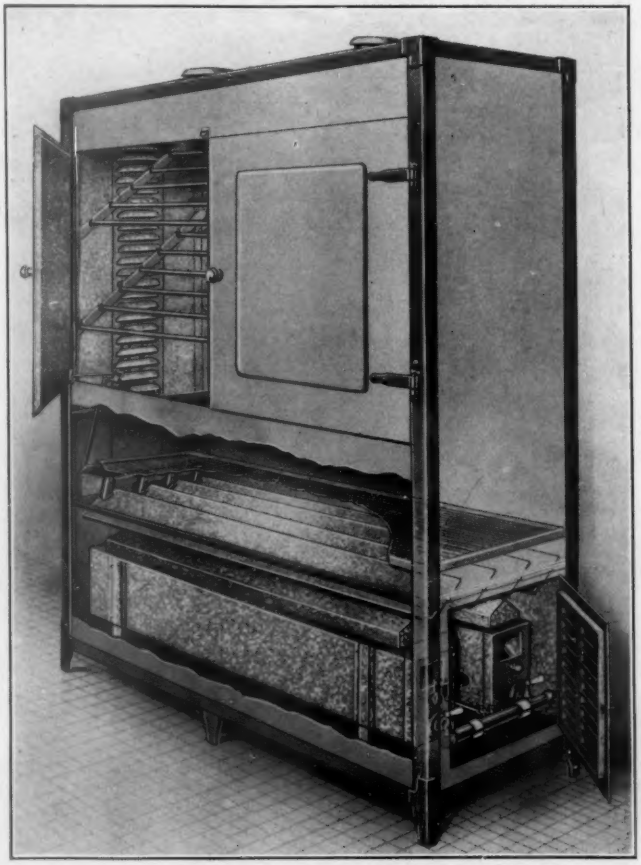
Displaying a Judelson Dryer on your sales floor will go a long way toward making your customers "dryer conscious"—and result in many quick sales.

Order a Judelson Dryer today and put this idea into profitable operation.

JUDELSON DRYER CORP.

Makers of Efficient Drying Equipment Since 1892

Moundsville, W. Va.



No. 602—Cabinet Type

A New

Silent

Dependable

An important deve opment—The New No. 600-A Electric Gas Valve

Electric Gas Valve

This new type Time-O-Stat valve operates quietly and dependably. Positive, *snap acting*, the No. 600-A sets a higher standard for electric gas valves.

Its new simplicity of design assures *dependable* operation. Moving parts have been reduced to a minimum. No gears or levers are employed. No intermediate relay is used, eliminating a former common cause of trouble. It will not overheat.

A gas-tight case encloses the valve, preventing any possibility of gas leak. All electrical contacts are on the *outside* of this case, removed from any danger of contact with gas. The outer case, which covers the contacts, is beautifully finished in black enamel. Smaller, more convenient in size than older models, it is easier to install.

When power fails, the valve automatically closes. While power is shut down, the valve can be operated by hand. As soon as power is resumed, it automatically comes under control of the room thermostat.

Used in conjunction with a room thermostat the new 600-A valve provides silent and dependable automatic control of all low-pressure gas-fired equipment: industrial and domestic heating plants—boilers—furnaces—conversion burners—unit heaters and industrial ovens.

This new valve is an important addition to Time-O-Stat's well known line of automatic controls. All have been perfected in Time-O-Stat research laboratories. Together they form the most complete line of automatic controls in the gas industry.

Write for information concerning these products, or on any problems of automatic control. Time-O-Stat's research facilities are at your service.

TIME-O-STAT
CONTROLS COMPANY
ELKHART, INDIANA

Successor to ABSOLUTE CON-TAC-TOR CORP. « LEACHWOOD COMPANY
TIME-O-STAT CORP. « CRAMBLET ENGINEERING CORP.

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Every day we are finding hundreds of home owners astonished to find that they have invested extra money in brass piping, with a galvanized iron automatic water heater tied in at the source. No matter how beautiful the exterior, it is the inside that counts. Iron tanks will rust and wear out. Copper will last forever.

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THE KOMPAK COMPANY,

H. J. Long,
President.

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Automatic Thermostatic
Gas Water Heaters

NEW BRUNSWICK
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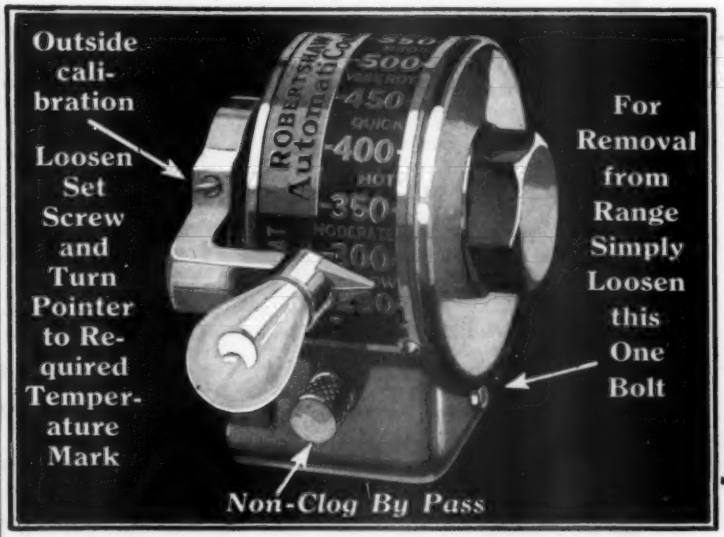
GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

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Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.
Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 100 leading makes of Gas Ranges

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No. 3406

Tycos

SHORT & MASON (English Manufacture)

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The Tycos Gas-Leak Indicator eliminates guesswork. Also, it saves time, labor and money.

It will detect and indicate the exact location of any gas leakage in the main. No hit-and-miss digging up pavement and pipe. No mistakes. You dig instantly to the seat of trouble.

The method is simple. First, make two search holes fifteen feet apart in the pavement where the leak is suspected. Second place the indicator over the search hole with the porous tile downward, packing it tight to prevent leakage of gas.

The indicator does the rest!

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IT automatically closes the ports of the regulator valve.

The valves have to be opened by hand before the flow of gas resumes.

No chance for dangerous explosions.

If the diaphragm of the regulator should burst, this cut-off would stop the flow of gas immediately.

More than forty years of experience in controlling gas pressure has taught us how to make this device dependable in its operation.

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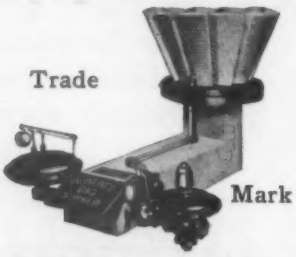

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Note down the hours, and possibly days, that you have lost in unproductive work, due to faulty valves which must be constantly repaired or replaced. Then figure out how much you are losing by using a valve of questionable value which you bought because it was "low priced."

Men who use Darling Valves say that their efficiency reduces losses in production to a minimum. They seldom need replacement—they last for years. Back of this superior performance are the years of skillful engineering—of untiring experimenting—and of exacting workmanship with the best materials. These well known Darling qualities stand out uniformly because Darling tests EVERY valve before it leaves the plant. Others are realizing a big saving by using the right kind of valve—you can do it, too.

"Darling Gate Valves are made in all types and sizes for Natural Gas service."

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WILLIAMSPORT, PA.
NEW YORK CHICAGO HOUSTON
OKLAHOMA CITY

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By Invitation Member

CLARK INDUSTRIAL BURNER TIPS

(Patented)

Manufactured in various gas capacities, and forms adapted to specific needs, these burner tips are employed by many industries where gas is used, and production depends upon a steady, dependable flame.

Made in 15, 30 and 45 cubic foot capacities to fit standard reducing couplings.

Write us for further information.

American Lava Corporation

29-59 William St. Chattanooga, Tennessee

Manufacturers of Lava Tips & Heat Resistant Insulators.

STOPPERS SINCE 1897

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GOODMAN CYLINDRICAL STOPPER
Inflatable for high pressures

Air-Line Masks, Bags, Rubber and Canvas Covered, Expansion Plugs, Joint Runners, Soap Tape, Binding Tape, Mittens and Gloves, Brushes, Soft Wood Plugs, Abbirko High Pressure Service-Cleaners, "U"-Gauges, Portable and Stationary.

Safety Gas Main Stopper Co.

523 Atlantic Ave., Brooklyn, N. Y.

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RE-CHROME METER LEATHER

COLONIAL BRAND

8 LOGICAL REASONS

showing advantages of "COLONIAL—Re-Chrome" over bark-tanned leather

BESSE, OSBORN & ODELL INC. · COLONIAL BRAND · BOSTON, U.S.A. · RE-CHROME METER LEATHER

1 Longer years service, hence less repairs.

2 More accurate measurement of gas. Eliminating slow and fast meters.

3 More impervious to water. Will stand a five minute boiling test.

4 Greater resistance to heat and climatic changes.

5 Stronger fibre, makes it more durable.

6 Absorbs more oil, less likely to dry out and harden.

7 More flexible, easier to fabricate, sew and crimp.

8 Eliminates "floppy" diaphragms.

This trade-mark, stamped on each New Zealand Lamb skin, is our guarantee to you that each skin has received the greatest care in its selection and tanning.

In use by some of the Largest Gas Companies in the country

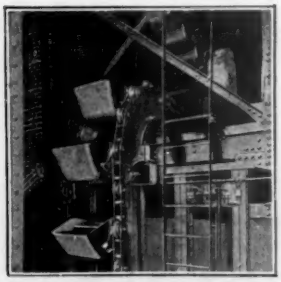
We will be pleased to submit sample

BESSE, OSBORN & ODELL, INC.

51 SOUTH STREET - BOSTON, MASS.

New York—177 William Street
W. A. Smith—G. Norman Bankart, Representatives.

Tanneries: Clinton, Me. *and* Peabody, Mass.



HUNT

PIVOTED BUCKET CONVEYOR

The peculiar system of driving by pawls, of which the Hunt is the only type existent, relieves the wheel of all stress. The Hunt conveyor can assume twists impossible with a sprocket driven machine.

WE DESIGN AND BUILD:

Industrial Railways, Automatic Railways, Cable Railways, Cars, Tracks, Switches, Motor Cars, Scales, Conveyors, Skip Hoists, Electric Vibrating Screens, Cut-off Valves, or Gates, Weighing and Measuring Devices, Coal Crackers, "Stevedore" Transmission Rope.

C.W.HUNT CO.Inc.
WEST NEW BRIGHTON,
STATEN ISLAND, N. Y.
Chicago - Montreal - Boston

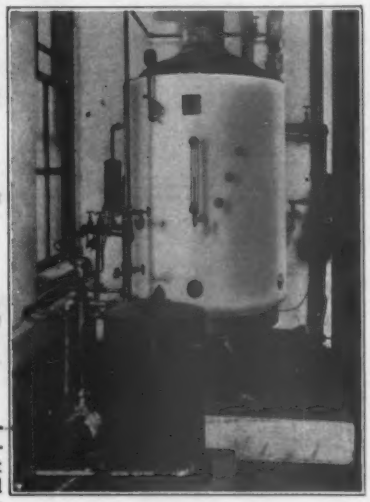
HUNT

LATTNER

Gas-Fired
High Pressure
Automatic
Steam

BOILERS

for



Clothing Manufacturers—for garment presses and steam irons;
Laundries—for laundry equipment and pressing machines;
Restaurants and Hotels—for steam tables, coffee urns, etc.,
Hospitals—for sterilizing equipment; for kitchen and laundry equipment;
Candy Manufacturers— for steam kettles;
Bakeries—for humidifying air in ovens and for steam proof boxes;
Bottling Plants & Dairies—for cleaning and sterilizing;
Printing Establishments— for heating matrix tables.

P. M. LATTNER MFG. COMPANY
Cedar Rapids, Iowa

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THE WAY UP AND WHY THEY GOT THERE
The Craig Ridgway & Son Company 3

EDITOR, AMERICAN GAS JOURNAL, 53 PARK PLACE, NEW YORK

Please send (at no expense to me) the following booklets.
(Insert numbers from list)

.....

.....

Name .....*Position* .....

Company .....

Address ....

Welding 14" Naylor Pipe on gas line laid in Texas by The Cabot Company.

Easily Welded — Right In The Field

. . . One of the Advantages of Naylor Pipe

FAST laying comes from quick welding. And the faster the line can be put in, the cheaper the costs.

Naylor Pipe is readily welded—right on the job.

Here are a few of the reasons why:

1. Toncan Iron—of which Naylor Pipe is made—is the finest welding material. (This is the opinion of a leading manufacturer of welding equipment.)
2. Because of its light weight (Naylor Pipe weighs 50% less than standard weight wrought pipe) it cuts and welds easier and quicker.
3. It is perfectly round anywhere in its length.
4. No special equipment is required to weld Naylor Pipe. It can be easily welded on skids. Toncan welding rod can be readily obtained.

These advantages make for greater speed in welding.... faster and cheaper laying. Think of them on your next pipe line.

Naylor Pipe will reduce your pipe line costs.

NAYLOR PIPE COMPANY

Main Office and Plant, 1230 East 92nd Street, Chicago

Sales Offices:

New York, 25 Church Street
Philadelphia, Witherspoon Building
Detroit, 1500 Cadillac Sq. Bldg.
Tulsa, 507 Philtower Building
Houston, 601 Post-Dispatch Building

DUCOMMUN CORPORATION

Los Angeles
San Francisco

Exclusive Distributors:
California, Arizona, Nevada and Utah

Montreal, Canada
Mechanical Equipment Company, New Birks Building

TONCAN COPPER

Naylor Pipe

Mo-lyb-den-um IRON

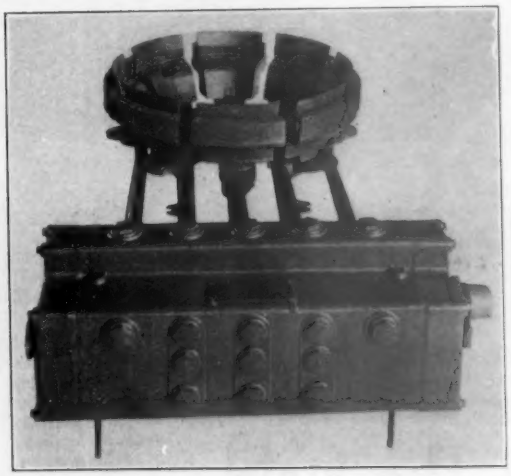
Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40' 0". Ends made to wrought pipe standards for all types of coupling.

Where corrosion resistance is not a factor, Naylor Pipe can be furnished in steel.

Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion resistance, making it the favored pipe material.

EXECUTIVES--MERCHANDISE MANAGERS--ENGINEERS

Why Overlook Another Source of Profit?



When so many of your prospects already own a coal fired heating plant that is in good condition, is it best to insist on their buying an entirely new boiler or furnace?

Install S&D Gas Burners Instead

And secure equal efficiency — On new construction urge your heating contractors to submit alternate bids on coal boilers equipped with this most economical gas conversion.

Displayed in Booths 131, 133 and 135, American Gas Association Exhibition, Atlantic City. Did You See It?

SWEET & DOYLE FOUNDRY & MACHINE CO.

Troy, New York

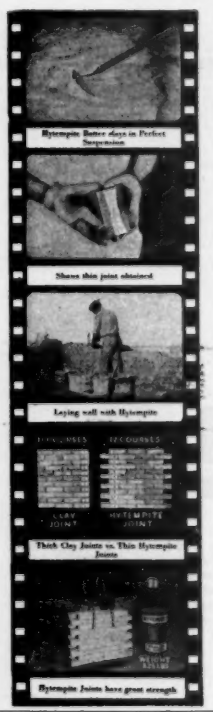
131 State St.
Boston

2013 Sansom St.
Philadelphia

50 Church St.
New York City

Don't Figure Refractory Costs

on a basis of price per thousand or price per pound



When you buy or specify materials for furnace wall construction and repairs consider—

First, Quality and Long Life.

Second, Cost per year of service including all labor costs.

Good firebrick laid with fire clay or inferior bonding material is a poor investment. Fire clay is merely a filler and doesn't bond the brick.

Repairing Baffles with Quigley Refractory Gun (Patented)

HYTEMPITE

(Reg. U. S. Pat. Off.)

"The standard for comparison in high temperature cements." Makes thin, tight joints throughout the furnace wall. It resists destruction from constant vibration and allows furnace operation at high temperatures for long periods without frequent shutting down for repairs.

When repairs are necessary crushed old fire brick bonded with HYTEMPITE are used for hot or cold patching.

Rapid repairs to hot furnaces are made with the Quigley Refractory Gun. It shoots premixed materials at any point in wall or arch. Hundreds of users of the Quigley Gun Jestify as to patching economies with this equipment. Let us send you information on patching and baffling.

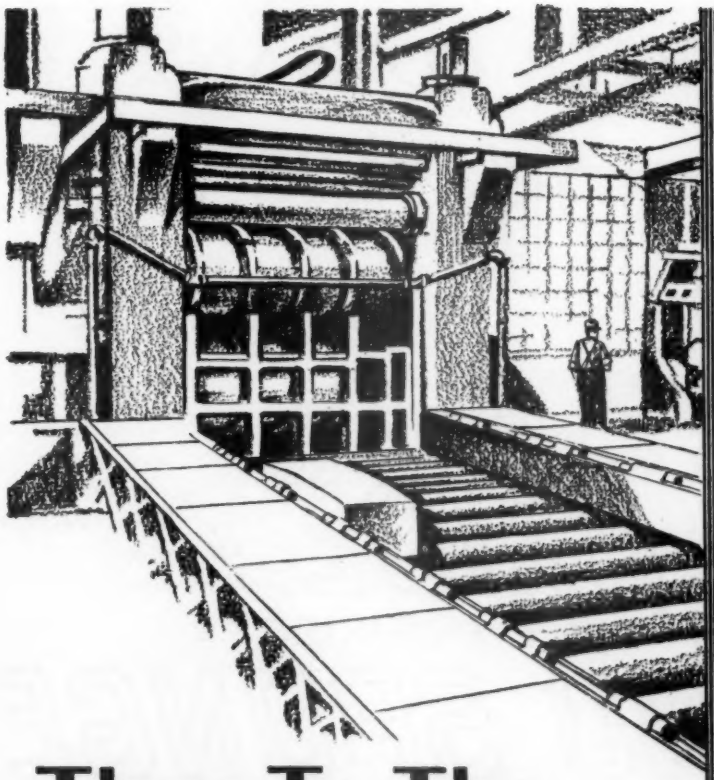
HYTEMPITE is carried in stock by Quigley agents in every industrial center throughout the United States and at many foreign points. Immediate delivery. Expert advice is at your service.

QUIGLEY FURNACE SPECIALTIES COMPANY INC.

56 West 45th Street **New York**

REFRACTORY MATERIALS FOR FURNACE CONSTRUCTION AND MAINTENANCE
ACID PROOF CEMENTS ACID AND ALKALI PROOF COATINGS

Stock and Service through Agents in Every Industrial Center



Then To The BLOOMING MILL

White hot from the pit . . . back and forth under the mighty pressure of the electrically controlled rolls . . . at just the right temperature . . .

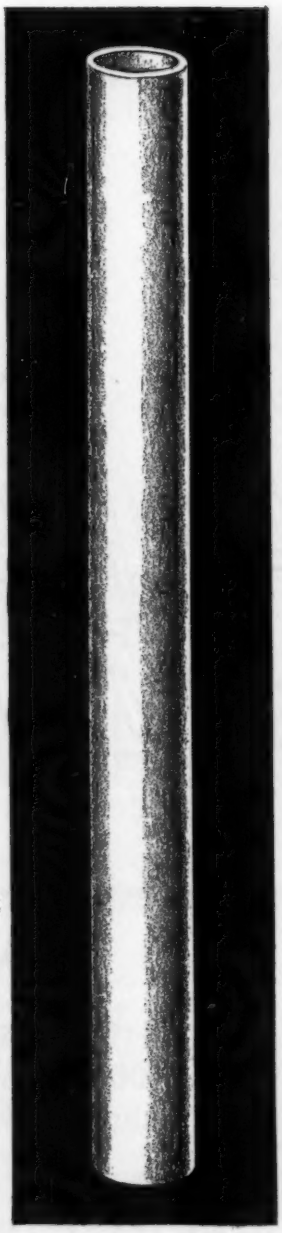
The equipment and methods of yesterday have no place in the exactness demanded by Pittsburgh Seamless standards of quality . . . a quality resulting from more than a quarter century devoted to the development and exclusive manufacture of seamless steel pipe and tubing.

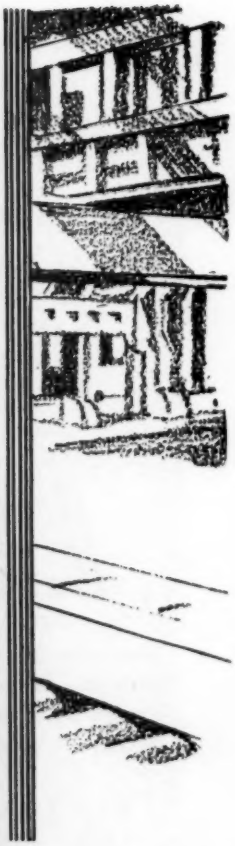
Pittsburgh Steel Products Co.

DIVISION OF Pittsburgh Steel Co.

Pittsburgh New York Chicago Detroit St. Louis Houston Tulsa

Pittsburgh Seamless





From Ore to Finished Pipe or Tube—Pittsburgh Seamless is the product of one Company's Resources and Skill.

Casing
Oil Well Tubing
Drill Pipe
Line Pipe

Lengths up to 45 Feet, depending on thickness and wall sizes.

Sizes ½" to 13⅜" O. D.

2919

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

LAVINO OXIDE

Intensely Active. High Total Sulphur Absorption at Minimum Cost.

"THE EFFICIENT PURIFIER"

The Sponge with the large Tough Shavings Always Uniform

LAVINO SPONGE

E. J. LAVINO and COMPANY - BULLITT BLDG. - PHILADELPHIA, PA.

NEW YORK CHICAGO PITTSBURGH

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

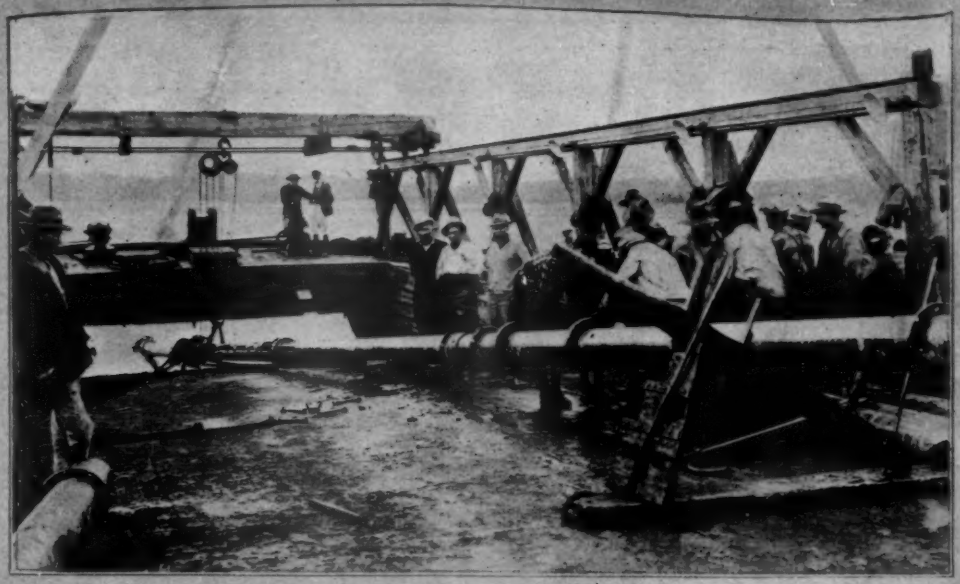
are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY

1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.



Laying water lines at Mississippi river crossing

208 Miles of 18-Inch Gas Line in 92 Days Is Record on Memphis Project

STARTING in Louisiana, this 208-mile 18-inch gas line reached Memphis in 92 days. Laying the line involved the crossing of cotton fields, gumbo, swamps, the Mississippi and four other rivers; nine railroads; canals, ditches and bayous—about the full range of experiences that would likely be encountered in laying a pipe line anywhere.

While much credit belongs to the skill of workmen and the wise supervision of the job, still a share may go to an ever-ready and adaptable pipe whose characteristics—more particularly strength, ductility and well-finished ends, meant much in the general success of laying the line.

There is much satisfaction in knowing that when difficult installation problems are encountered which place extra strain on the pipe, such as, crossing rivers and deep ravines, that the pipe can be counted upon to meet these special conditions in a thoroughly satisfactory manner. The extensive use of NATIONAL for lines involving unusual engineering problems is substantial evidence of the reliability of this pipe for special and difficult conditions—one of the reasons why NATIONAL is

AMERICA'S STANDARD PIPE FOR GAS LINES

NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Subsidiary of United States Steel Corporation

NATIONAL PIPE

Buyers' Reference Index

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The Western Gas Construction Company.

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Kuth's Steam Accumulator Co.
A. O. Smith Corp.
Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE
The Prest-O-Lite Co., Inc.
Oxweld Acetylene Co.

ACETYLENE EQUIPMENT
American Lava Corp.

ACCOUNTING MACHINES
Remington Rand, Inc.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
Riter-Conley Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
The Brown Instrument Co.
United Engineers & Constructors, Inc.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.

BAGS
Safety Gas Main Stopper Co.

BAROMETERS
Connelly Iron Sponge & Governor Co.
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies

BENCHES
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Gas Machinery Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BENZOL
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Indugas, Inc.
The Koppers Construction Co.

BENZOL RECOVERY PLANTS
Semet-Solvay Engineering Corp.

BLOWERS
Connersville Blower Co., The.
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
Bartlett-Hayward Co.
Indugas, Inc.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BOILERS (GAS FIRED)
P. M Lattner Mfg. Co.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Combustion Engineering Corpn.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

BOOKKEEPING MACHINES
Remington Rand, Inc.

BOOSTERS
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The

BRICK
Fire and Checker
Botfield Refractories Co.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment Co.-Russell Eng. Corp.
United Engineers & Constructors, Inc.
United States Refractories Corp. Silica
The Gas Machinery Co.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Company.
United States Refractories Corp. High Alumina
General Refractories Co.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
Alpha-Lux Co.

BUILDINGS
United Engineers & Constructors, Inc.

BURNERS (Industrial)
American Lava Corp.
Columbia Burner Co.
Conversion
Conversion House Heating
Columbia Burner Co.
Roberts Gas Burner Corp.
Fuel

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
Indugas, Inc.
The Gas Machinery Co.
International Coal Carbonization Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.

CABLE RAILWAYS
C. W. Hunt Co., Inc.
Alpha-Lux Company.
American Meter Co.
Consolidated Ashcroft Hancock Inc., Co.

CALORIMETERS
John J. Griffin & Company.

CALORIMETER ACCESSORIES
American Meter Co.

CARBIDE
Union Carbide Sales Co.

CARBONIZATION
The Gas Machinery Co.
Low Temperature
International Coal Carbonization Co.

CARBURETTED WATER GAS
The Western Gas Construction Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

CARS
C. W. Hunt Co., Inc.

CASINGS, SEAMLESS STEEL
National Tube Co.

CAST IRON PIPE
Bell
Cast Iron Pipe Research Ass'n.
Spigot
Cast Iron Pipe Research Ass'n.

CEMENTS
Acid-proof
Botfield Refractories Company.
General Refractories Co.
Quigley Furnace Spec. Co., Inc.
Firebrick
Botfield Refractories Company.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United States Refractories Corp.
High Temperature
Alpha-Lux Company.
Botfield Refractories Company.
General Refractories Co.
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.
Refractory & Engineering Corp.
United States Refractories Corp. Refractory
Botfield Refractories Company.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.
General Refractories Co.
United States Refractories Corp. Silica
General Refractories Co.

CHAMBER OVENS
United Engineers & Constructors, Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

CHUTES
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

CLAMPS (PIPE)
S. R. Dresser Mfg. Co.

CLOCKS & WATCHES, Stop
American Meter Co.

COALS
Boone County Coal Corpn.
Logan County Coal Corp.
Westmoreland Coal Co

COAL GAS APPARATUS
Bartlett-Hayward Co.
Indugas, Inc.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company.
The Western Gas Construction Company.

COAL & COKE BINS CASTINGS
The Koppers Construction Co.
The Stacey Mfg. Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
Dry Quenching Equipment Corp
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors Inc.

COAL TAR PRODUCTS
International Combustion, Tar, and Chemical Corpn.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.
Meter
American Meter Co.
Superior Meter Co.
Service
American Meter Co.

COKE CRUSHERS
The Koppers Construction Co.

COKE QUENCHING
Dry Quenching Equipment Corp.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COKE RECLAMATION SYSTEMS
C. W. Hunt Co., Inc.

COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

CONDENSERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors Inc.

CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
The Bristol Company.
The Brown Instrument Co.
Robertshaw Thermostat Co.
Time-O-Stat Controls Co.
Combustion
Smoot Engineering Corp.
Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Hot Water Heat System
The Cleveland Heater Company.
Water Gas Machine
Smoot Engineering Corp.

CONVEYORS
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.

COOLERS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
Air
Andale Company.
Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
Andale Company.

COOLING COILS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

THE BABY DIGGER

THE LOGICAL MACHINE FOR GAS TRENCH WORK!

It's easy to see why the Cleveland Baby Digger is the logical machine for digging gas trench. It is especially designed to meet the requirements of this class of work. The Baby Digger can and does save more money in more places.

It handles profitably even the small 80 and 100 foot city and suburban extensions that are continually being made, as well as the longer and larger lines of main.

Its unequalled ability to move quickly and cheaply from job to job on its own specially built trailer (loading time, five minutes), its extreme compactness which permits it to slip by the obstructions normally encountered when working in built-up sections of the city, as well as its fine, modern mechanical construction—all these are real vital reasons why a Baby Digger is *the* equipment for your work.

And don't forget that actual records show the *average* cost of digging with the Baby Digger is but one-fourth that of trenching by hand-labor.

Visualize such performance on your work and it's not hard to understand why so many gas companies have standardized on these compact, mobile, powerful Baby Diggers.

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

20100 St. Clair Ave., Cleveland, Ohio

Buyers' Reference Index

See page 121 for advertisements of these products

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Victaulic Co. of Amer.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

CUBIC FOOT BOTTLES
Superior Meter Co.

CUTTING APPARATUS & SUPPLIES
Union Carbide & Carbon Co.

CRUSHERS
Riter-Conley Company.

CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.

DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEHYDRATORS, GAS
Andale Company.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.

DEMONSTRATION METERS
Lambert Meter Co.

DIAPHRAGMS (Meter)
Lambert Meter Co.
Superior Meter Co.
American Meter Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.

DRAFT GAUGES
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

DRYERS (Laundry)
Judelson Dryer Corpn.
W. E. Lamneck Co.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
C. W. Hunt Co., Inc.
Craig Ridgway & Son Co.
Robins Conveying Belt Co.

ENGINE INDICATORS
Consolidated Ashcroft Hancock Co., Inc.

ENGINEERS
American Meter Co.
The Gas Machinery Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
Bartlett-Hayward Co.
Edw. A. Dieterle
United Engineers & Constructors, Inc.
George H. Waring.
The Western Gas Construction Company.
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Company.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
Distribution
United Engineers & Constructors, Inc.
Measurement
American Meter Co.

EXHAUSTERS
Connersville Blower Co., The
The Gas Machinery Co.
Isbell-Porter Company.
The P. H. & F. M. Roots Company.
The Western Gas Construction Company.

EXPANSION BENDS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

FILES (Steel and Wood)
Remington Rand, Inc.

FILES (Visible)
Remington Rand, Inc.

FILTERS, Gas
American Meter Co.

FIREBRICK, CEMENT
General Refractories Co.
Quigley Furnace Specialties Co., Inc.
Refractory & Engineering Corp.

FIREBRICK CHECKER BRICK (See Brick)
Botfield Refractories Company.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FIRST AID EQUIPMENT
United Engineers & Constructors, Inc.

FITTINGS
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe and Foundry Co.
The Western Gas Construction Company.
Plain End and Flanged
Cast Iron Pipe Research Association.

FIXTURES
American Lava Corp.

FLOORS, IRON, BRICK, AND STEEL
The Gas Machinery Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FLOW METERS
Brown Instrument Co., The
Lambert Meter Co.

FLUE PIPE (Cast Iron Oval)
Semet-Solvay Engineering Corp.

FURNACES
Combustion Engineering Corpn.
Gas Fired
The C. M. Kemp Mfg. Co.
Gas Soldering
American Meter Co.

GAS ANALYSIS APPARATUS
Metric Metal Works.

GASKETS
American Meter Co.
Consolidated Ashcroft Hancock Co., Inc.
Pittsburgh Equitable Meter Co.
Superior Meter Co.

GAS COAL
Boone County Coal Corpn.

GASOMETERS (Test)
American Meter Co.

GAS PLANTS, COMPLETE
Indugas, Inc.
Gas Engineering Co.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.

GASSING MACHINE
American Meter Co.
Lambert Meter Co.
Superior Meter Co.

GAS TAPE
Connelly Iron Sponge & Governor Co.

GAS TESTING APPARATUS
Metric Metal Works.

GATE VALVES (See Valves)

GATES—WIND & BLAST
The P. H. & F. M. Roots Company.

GAUGE BOARDS
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

GAUGES
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Maryland Meter Co.
Metric Metal Works.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Superior Meter Co.
Taylor Instrument Companies.
Tagliabue Mfg. Co., C. J.
The Western Gas Construction Company.
Mercury
Precision Thermometer & Instrument Company.
Pressure-Recording
Consolidated Ashcroft Hancock Co., Inc.
D. McDonald & Co.
Precision Thermometer & Instrument Company.
Tagliabue Mfg. Co., C. J.
Siphon
Precision Thermometer & Instrument Company.
Tank
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.

GLOVES
Rubber
Safety Gas Main Stopper Co.

GOVERNORS
Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Gas Industries Laboratories.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.

GOVERNORS (Calorimeter and Double Dry)
American Meter Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Helme & McIlhenny.
Isbell-Porter Co.
Smoot Engineering Corp.
Exhauster
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The
The Gas Machinery Co.
Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
American Meter Co.
Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
Low Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station
Helme & McIlhenny.

GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.

GRAVITOMETERS
Precision Thermometer & Instrument Company.

GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.

HEATERS
Feed Water
Andale Company.
House
American Gas Products Corp.
American Stove Company.
Homestead Heater Company.
Welsbach Company.
The Cleveland Heater Company.
Humphrey Company.
Kompak Company.
Welsbach Company.
Pittsburg Water Heater Co.

HIGH CAPACITY METERS
Lambert Meter Co.

HIGH PRESSURE PIPE LINES
The Western Gas Construction Company.

HOISTS
The Gas Machinery Co.
C. W. Hunt Co., Inc.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
Riter-Conley Company.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.

HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

HYDROGEN SULPHITE TEST (Apparatus)
American Meter Co.

HYDROMETERS
The Brown Instrument Co.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

INCINERATORS, GAS-FIRED
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Smoot Engineering Corp.

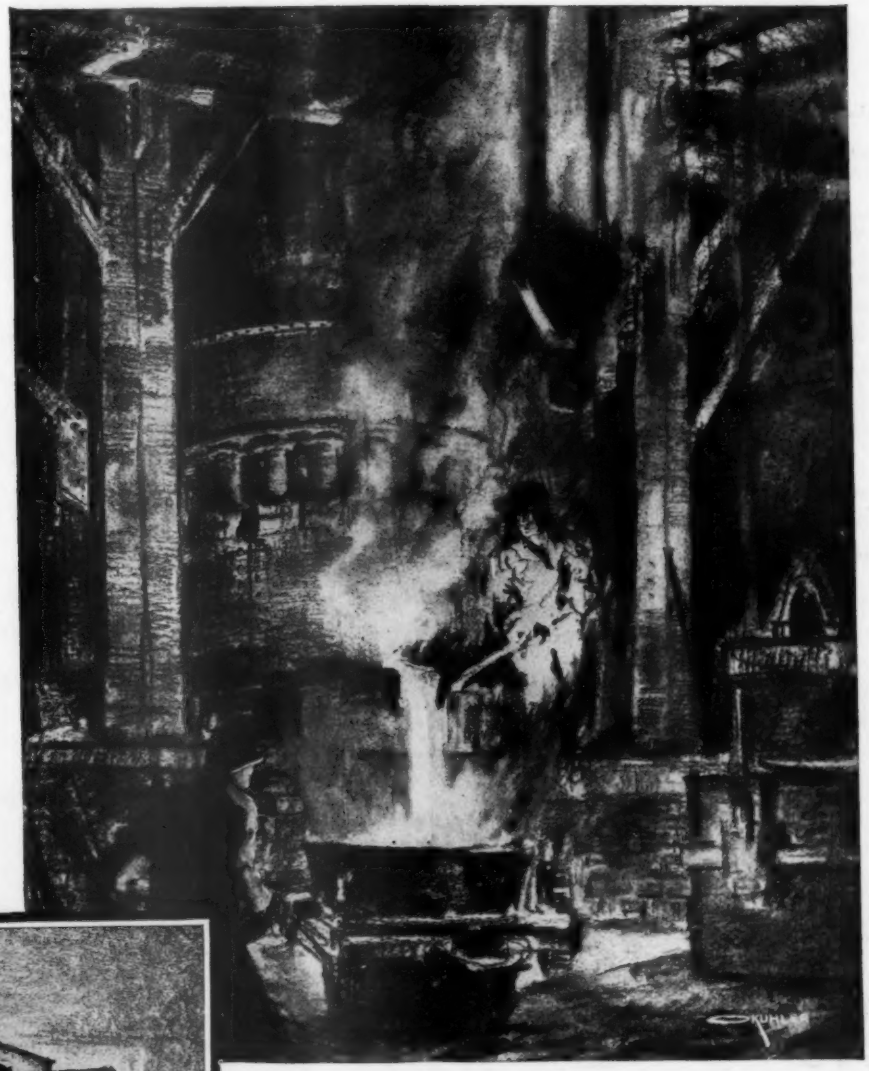
INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

IRON BORING OXIDE
Gas Purifying Materials Co., Inc.

IRON SPONGE
Connelly Iron Sponge & Governor Co.

IRONERS (Gas Heated)
Hurley Machine Company.

INSTRUMENTS
Alpha-Lux Company.
The Bristol Company.
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
Time-O-Stat Controls Co.
Recording
American Meter Co.



After being carefully cleaned and inspected all pipe for water service are uniformly heated in an oven and then submerged in a vat or tank of hot coal tar pitch varnish.

CAST Q IRON

The "Q-check" symbol shown above has been adopted as the trade mark of The Cast Iron Pipe Research Association. Insist on this "Q-check" mark when specifying cast iron pipe for gas, water, sewer, or industrial service. For complete information write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago.

SCIENCE and invention and modern machinery have brought about a uniformity in cast iron pipe not possible a score of years ago. For example, the mixing of raw materials—melting—and pouring operations are all under the direction and control of a technically trained metallurgist. Scientific investigation has proved that the temperature at which the raw material is melted as well as the rates of pouring and cooling have to do with the high quality of modern cast iron pipe.

* * *

The Cast Iron Pipe Research Association is a service organization of leading pipe founders, formed to promote the scientific improvement and proper use of Cast Iron Pipe. Pipe bearing the Association "Q-check" mark may be obtained from the following: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Co., Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Co., Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe & Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York City.

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CAST IRON PIPE

Buyers' Reference Index

See page 121 for advertisements of these products

JOINTS (Pipe)
S. R. Dresser Mfg. Co.
U. S. Cast Iron Pipe & Foundry Co.
Insulating
United Engineers & Constructors, Inc.
Victaulic Co. of Amer.
JOINT RUNNERS
Safety Gas Main Stopper Co.
LAMP POSTS
General Gas Light Co.
LAUNDRY EQUIPMENT
W. E. Lamnock Co.
LAVA BURNER GRIDS
American Lava Corp.
LAVA PILOT TIPS
American Lava Corp.
LINING—REFRACTORY
(See Refractory Linings
LOCKERS
Remington Rand Co.
LOOSE LEAF EQUIPMENT
Remington Rand Co.
LUX MATERIAL
Alpha-Lux Company.
LUX SPONGE
Alpha-Lux Company.
MANILA AND WIRE ROPE
C. W. Hunt Co., Inc.
MANOMETERS
Brown Instrument Co., The
Precision Thermometer & Instrument Company.
MANTLES
General Gas Light Co.
Welsbach Company.
MASKS—GAS
Safety Gas Main Stopper Co.
MAST & GAFF OUTFITS
C. W. Hunt Co., Inc.
MEASURING CHUTES
C. W. Hunt Co., Inc.
MECHANICAL GENERATORS
for Water Gas App.
United Engineers & Constructors, Inc.
METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
Lambert Meter Co.
D. McDonald & Co.
Maryland Meter Works.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
METER REPAIRING
Lambert Meter Co.
Superior Meter Co.
METER TESTER, Hydro-Pneumatic
American Meter Co.
METERS
Brown Instrument Co., The
Pittsburgh Equitable Meter Co.
Air
American Meter Co.
Connersville Blower Co., The
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Artificial
American Meter Co.
Connersville Blower Co., The
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Demand
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Lambert Meter Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Superior Meter Co.
Demonstration
American Meter Co.
Dry
Superior Meter Co.
John J. Griffin & Company.
American Meter Co.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Exhibition
American Meter Co.
Natural Gas
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Meter Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Oil
American Meter Co.
Connersville Blower Co., The
The Gas Machinery Co.
Orifice
American Meter Co.
Positive
The Sprague Meter Co.
Prepayment
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Proportional
The P. H. & F. M. Roots Company.
Station
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
Nathaniel Tufts Meter Works.
The Western Gas Construction Company.
Steam
American Meter Co.
The Gas Machinery Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company
Test
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Wet Test
American Meter Co.
METER LEATHER
Besse, Osborn and Odell, Inc.
MILLER GRIP PACKING
Connelly Iron Sponge & Governor Co.
MIXERS, GAS
Roberts Gas Burner Corp.
Semet-Solvay Engineering Corp.
Smoot Engineering Corp.
MOISTURE DETERMINATORS
United Engineers & Constructors, Inc.
MOTOR CARS
C. W. Hunt Co .,Inc.
NAPHTHALENE EXTRACTORS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
OFFICE FURNITURE
Remington Rand, Inc.
ORE, CHROME
E. J. Lavino & Co.
General Refractories Co.
OVEN HEAT CONTROLS
Wilcolator Co.
OVENS (REEL TYPE BAKE)
The Bruce McDonald Co.
OVENS—COKE AND GAS
Indugas, Inc.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
OXIDE
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co., Inc.
E. J. Lavino & Co.
OXYGEN
Linde Air Products Co.
OXYGEN AND HYDROGEN METERS
Lambert Meter Co.
Superior Meter Co.
PACKING
Asbestos
Safety Gas Main Stopper Co.
PAINTS
Cheesman-Elliott Co.
Safety Gas Main Stopper Co.
The Stacey Mfg. Co.
Wailes Dove-Hermiston Corp.
Metal Protective
Semet-Solvay Co.
PAINTS, ANTI ACID AND ALKALI
Cheesman-Elliott Co.
Quigley Furnace Spec. Co., Inc.
PAINTS, RUSTPROOF
Cheesman-Elliott Co.
Quigley Furnace Spec. Co., Inc.
PHOTOMETERS
Connelly Iron Sponge & Governor Co.
PILOTS-SAFETY
Time-O-Stat Controls Co.
Wilcolator Co.
PIPE
Waylow Pipe Co.
Hedges-Walsh-Weidner Co.
National Tube Co.
Naylor Pipe Co.
The Stacey Mfg. Co.
Bell
American Meter Co.
Semet-Solvay Engineer.ng Corp.
McWane Cast Iron Pipe Co.
Bell and Spigot
U. S. Cast Iron Pipe & Foundry Co.
Cast Iron
McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Flange
Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Screw Joint Cast Iron Pipe
McWane Cast Iron Pipe Co.
Seamless Steel
Pittsburgh Steel Products Co.
Spigot
McWane Cast Iron Pipe Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Naylor Pipe Co.
Steel
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Naylor Pipe Co.
National Tube Co.
Pittsburgh Steel Products Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Spiral Welded Pipe
Naylor Pipe Co.
Welded Steel
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
PIPE COATINGS
Wailes-Dove-Hermiston Corp.
PLANTS—GAS, COMPLETE
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
The Koppers Construction Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company
PLATES
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Floor
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
PLUGS, SERVICE AND MAIN
Rubber
Safety Gas Main Stopper Co.
Soft Wood
Safety Gas Main Stopper Co.
PORTABLE TEST METERS
Lambert Meter Co.
Superior Meter Co.
PRODUCER GAS PLANT
Gas Engineering Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
PRODUCER GAS STEAM
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Gas Purifying Materials Co., Inc
The Koppers Construction Co.
E. J. Lavino & Co.

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The Western Gas Construction Company.

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Maryland Meter Works
The Bristol Company.
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Taylor Instrument Companies.
United Engineers & Constructors, Inc.
Radiation
Taylor Instrument Companies.
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The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.

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Gas Steam
American Gas Products Corp.

RANGES—GAS
American Stove Co.

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The Brown Instrument Co.

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The Brown Instrument Co.
Lambert Meter Co.
Maryland Meter Works

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General Refractories Co.
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E. J. Lavino & Co.
Quigley Furnace Spec. Co. Inc.
Refractory & Engineering Corp.
United States Refractories Corp.

REFRACTORY GUN
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Time-O-Stat Controls Co.
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Exhauster
Smoot Engineering Corp.
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Smoot Engineering Corp.
Oven
American Stove Co.
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Smoot Engineering Corp.

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Connelly Iron Sponge & Governor Co.

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Improved Equipment—Russell Engineering Corp.
Vertical
United Engineers & Constructors Inc.
West Gas Improvement Co.
Silica and Clay
Improved Equipment—Russell Engineering Corp.
The Gas Machinery Company
United States Refractories Corp.

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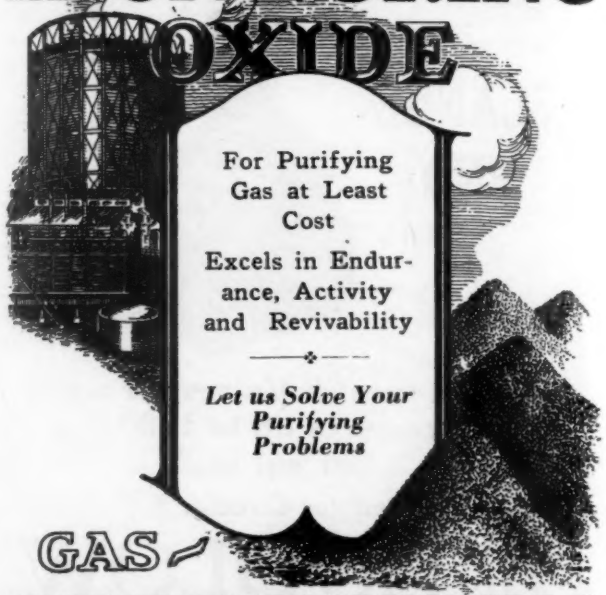

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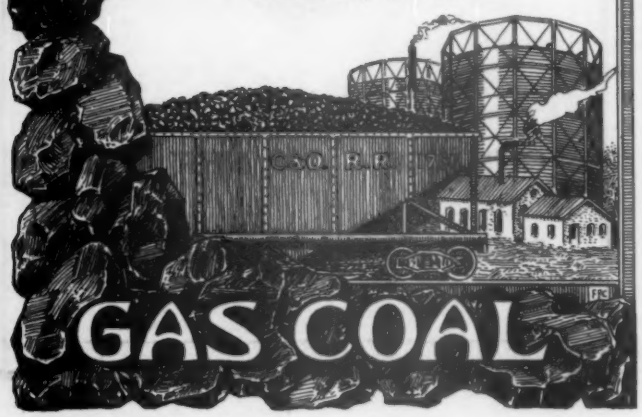

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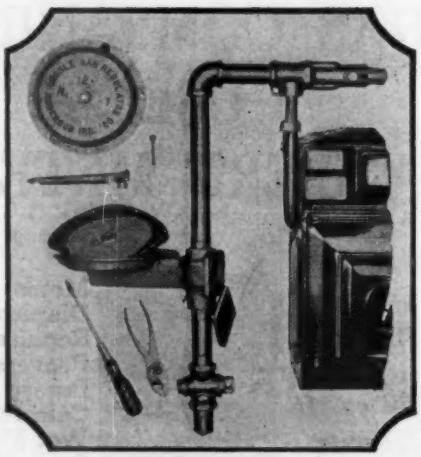

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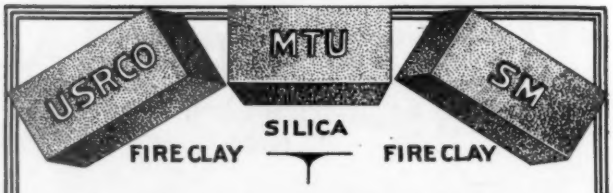

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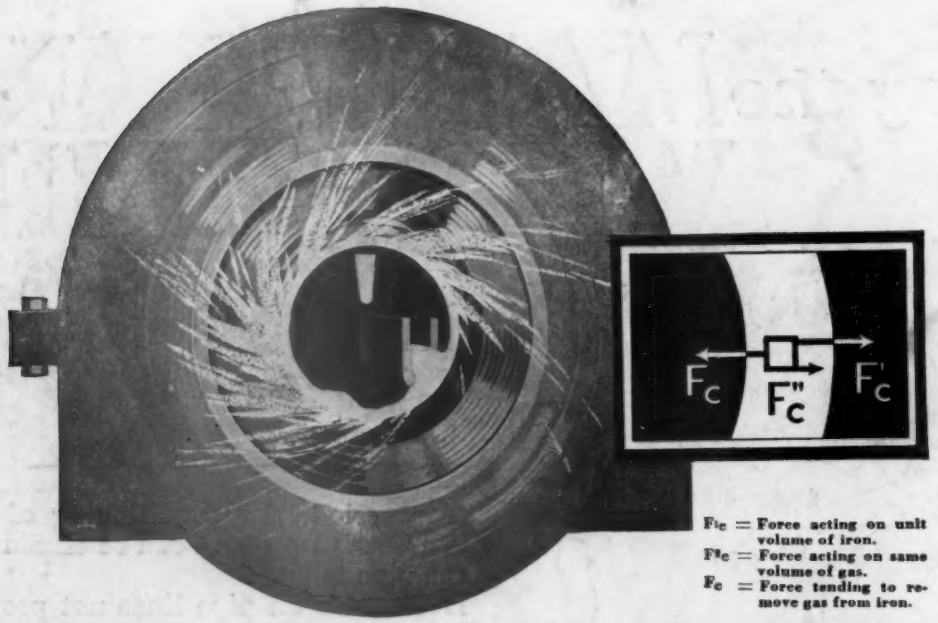

F'_c = Force acting on unit volume of iron.
F''_c = Force acting on same volume of gas.
F_c = Force tending to remove gas from iron.

In the manufacture of deLavaud Pipe, a force 40 times greater than gravity drives out impurities and builds a 25% stronger pipe.

deLavaud Pipe is made by pouring molten iron into a rapidly revolving cylindrical mold. Centrifugal force holds the metal against the sides of the mould and drives out impurities with a force, which every engineer knows, is 40 times greater than gravity.

Thus deLavaud Pipe is remarkably free from slag and weakening gas bubbles. And because it is actually cast under the pressure, resulting from the force $F_c = \frac{Wv^2}{gR}$ the pipe wall is dense and strong, allowing a greatly increased carrying capacity.

The results of strength tests performed on deLavaud Pipe are little short of amazing. In tests recently conducted by an outside authority, deLavaud results (when compared with good pit cast pipe) showed 100% greater tensile strength, 65% greater transverse strength and 25% greater bursting strength.

Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

Engineers and contractors who want a gas or water pressure pipe of greater durability and a greater factor of safety will find it a satisfaction and a surprising economy to specify deLavaud Pipe.

Let us send you the deLavaud handbook. Here you will find all the facts and figures about deLavaud Pipe, including types of joints and dimension tables.

United States Pipe and Foundry Co., Burlington, New Jersey

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles